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Table of Contents

1. Chinese Video Surveillance Industry, Ming Lu 4
2. China Auto Parts A Shares: Parts Of The Future, Victoria Li 28
3. China Infrastructure Deep Dive: Gas Utilities H & A Shares, Osbert Tang, CFA 74
4. China Aerospace & Defense A Shares: An In-Depth Walkthrough, Osbert Tang, CFA 143
5. China Property Management - Sector Deep Dive and Evaluation Framework, Sameer Taneja 224
6. China Environment Sector Deep Dive: Solid Waste Treatment, Osbert Tang, CFA 247

Cover Photo by Hanson Lu

Ming Lu

Overseas Chinese Equities | Aequitas Research

Ming Lu has more than 17 years of experience in equity research, covering companies that operate in China but are listed in the US or Hong Kong, focusing on Chinese internet, consumer, and education firms.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: China
- Sectors: Information Technology

Content Verticals

- Equity Bottom-Up, Thematic (Sector/ Industry)

Zhejiang Dahua Technology A | Equity Bottom-Up

Chinese Video Surveillance Industry

By Ming Lu | 31 Jan 2020

EXECUTIVE SUMMARY

Introduction

The video surveillance market is speeding up in China and globally. The world's top two surveillance companies are both headquartered in China and there are 4 Chinese companies in the global top-10 according to the A&S ranking.

The "snow bright" project shows that the Chinese government aims to cover suburban areas with surveillance systems. The outbreak of the coronavirus confirms the necessity of the "snow bright" project. However, there are concerns on the industry particularly when the U.S. Entity List aims to block the supply of semiconductor chips to surveillance equipment providers in China.

Today investors outside mainland China can buy China-listed surveillance companies via the Northbound Shenzhen and Shanghai Connect. In this note, we deep dive into the video surveillance industry in China and try to find out investment opportunities in this industry.

What is original in this report?

1. A Chinese governmental committee wanted to cover suburban areas with video surveillance via the "snow bright" project. In fact, local governments did not start the project until the State Council gave the second order in 2019. We believe most local governments will focus on fighting the coronavirus and have no spare capacity for "snow bright" in the first half of 2020. However, we expect the governments will pay more attention to video surveillance after the epidemic event, because, millions of Wuhan residents left the viral epicenter sealed by the municipal government by untracked vehicles. This huge security loophole proves the importance of surveillance systems in suburban areas.

2. We believe the market undervalued Dahua merely based on its slow revenue growth. However, we notice that, among the top-three Chinese video surveillance companies, Dahua is the only one that improved its operating cash flows and margins. We believe earnings per share will grow 22% in 2020 and 25% in 2021 due to the accelerating revenues and the stable margin.

Contents

A. Domestic Market – Demand from “Snow Bright Project”

1. China Market in Previous Years
2. Governmental Project – “Snow Bright”
3. Expected Influence in Suburban Market

B. Global Market and Leading Position of Chinese Companies

1. Promising Market
2. Rapidly Growing Chinese Companies
3. International Exploration of Chinese Companies
4. Concern for U.S. Companies

C. Leading Chinese Companies

1. Value Chain of Surveillance Companies
2. Background of Leading Companies
3. Domestic vs. Overseas Revenues
4. Growth and Margin
5. Operating Cash Flow

D. Risks

1. U.S. Entity List
2. The Competitor HiSilicon of Huawei
3. Coronavirus

E. Valuation

F. Conclusion

G. Appendix

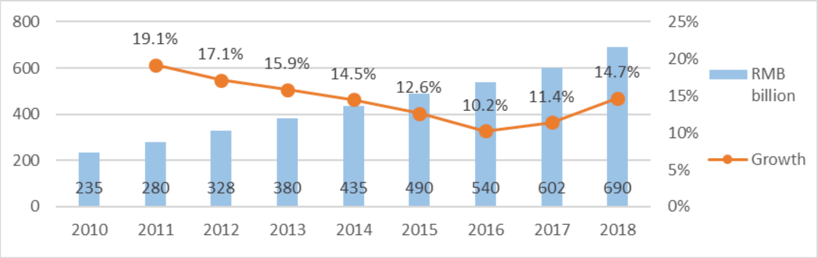
DETAIL

A. Domestic Market – "Snow Bright Project" to Drive the Growth

1. **China Market in Previous Years**

"China is by far the largest single market probably accounting for 35% to 40% of world demand," A&S commented in its 2019 security report. The China market is not only big, but also rapidly growing. The growth rate of the market size accelerated in 2017 and 2018 (Exhibit 1).

Exhibit 1: China Security Market Size



Source: China Security and Protection Industry Association (CSPIA) and Aequitas Research.

2. **Governmental Project – "Snow Bright"**

How about the years after 2019? The project "Snow Bright" comes.

In 2016, the "Snow Bright" project (雪亮工程) was launched by the Political and Legal Committee of China (in charge of the police, judicial courts, etc.). The project aims to extend the public video surveillance network into suburban areas. However, provincial governments did not actively support the project. We believe it was because neither the committee nor provinces had extra budgets at that time.

In January 2018, the State Council of China imposed the order *The Strategy on Prosperity in Suburbs (关于实施乡村振兴战略的意见)*, which formally mentioned the "Snow Bright" project for the first time. In February 2019, the State Council reiterated "Snow Bright" in the order *The Priority of Agriculture, Suburb, and Farmers (关于坚持农业农村优先发展做好"三农"工作的若干意见)*. Thereafter, provincial governments can spend budgets on the project. Since 2019, more and more local governments called for biddings. It was a huge market as there are 2,016 counties in the suburbs of China. More importantly, we believe, when local governments have budgets, they care about quality much more than price.

We believe, in the first half of 2020, most local governments will focus on fighting the coronavirus and have no spare energy to follow the “snow bright” project. However, we also believe local governments will pay more attention to video surveillance after the event, because, by vehicles, 5 million out of 14 million Wuhan residents left the viral epicenter sealed by the municipal government. Many of them left by vehicles through suburban areas. The huge loophole exactly proves the importance of the “snow bright” project, which aims to cover suburban areas.

3. Expected Influence in Suburban Market

“Snow Bright” only cover roads. However, we believe the project will educate institutions in the small city markets that cameras can help.

Small cities are under the same threats as big cities. The cases below happened in China.

(1) Patients’ families beat medical doctors. Therefore, hospitals need surveillance.

(2) Desperate adults killed pupils on campuses. Therefore, schools need surveillance.

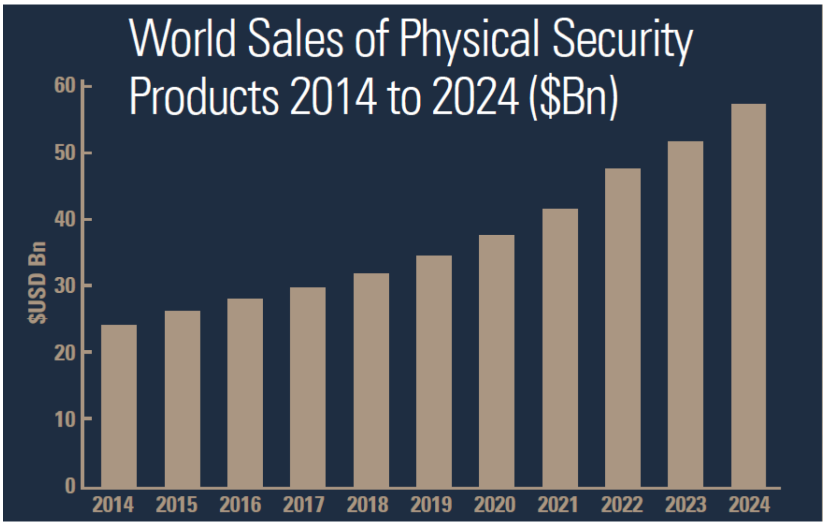
(3) Gangsters blackmailed retailers. Bazaars need surveillance.

(4) Theft. Office buildings and communities need surveillance.

These are righteous surveillance, as so far Chinese citizens have never accused the police of privacy breach for the cameras in public places.

B. Global Market and Leading Position of Chinese Companies

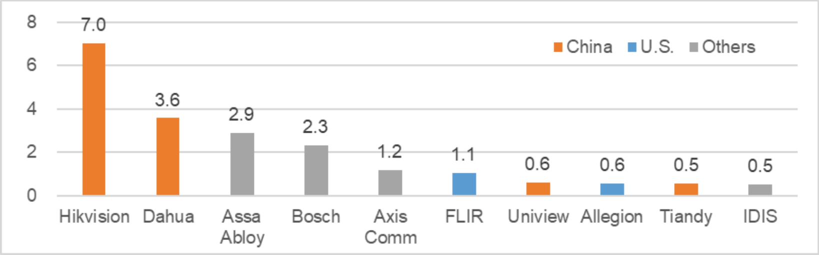
Exhibit 2: Global Market Size of Physical Products



Note: At factory gate prices. Source: Memoori.

1. **Promising Market:** Security solution is an accelerating market. According to Memoori (Exhibit 2), the global security market size will grow by a CAGR of 10.7% in the following 5 years (2019 ~ 2024) versus a CAGR of 7.2% in the last 5 years (2012 ~ 2017).

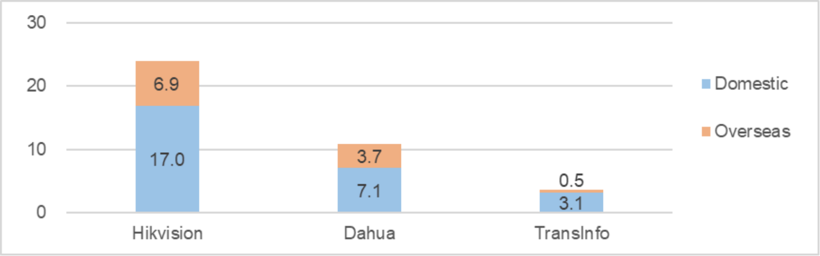
Exhibit 3: Top Global Security Companies (2018 Revenues in USD billion)



Source: A&S December 2019 and Aequitas Research.

1. **Rapidly Growing Chinese Companies:** There are 4 Chinese companies in the global top-10 (Exhibit 3) and 11 Chinese companies in the global top-50 according to the A&S ranking. More importantly, the global top-2, Hikvision (002415 CH) and Dahua (002236 CH), are headquartered in China. (Exhibit 3).

Exhibit 4: Geographic Revenue Breakdown of Top Three Companies (RMB bn)



Note: 1H2019. Source: Company data and Aequitas Research.

3. **International Exploration of Chinese Companies:** The top two Chinese companies gained a lot in the international market (Exhibit 4). However, so far, most revenues of Chinese companies are from the domestic market. We believe Chinese companies will be able to gain more global market share, although there were headwinds in 2019. For examples, U.S. Department of the forbids U.S. companies from providing parts to the Chinese surveillance companies on the Entity List (Exhibit 5).

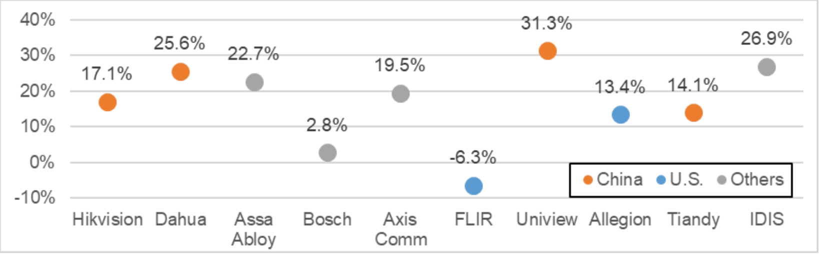
Exhibit 5: New Companies in U.S. Entity List in October 2019

Company	Ticker	A&S Global Rank
Dahua	002236 CH	2
Hikvision	002415 CH	1
iFLYTEK	002230 CH	
Megvii Tech	Private	19
SenseTime	Private	
Xiamen Meiya Pico	300188 CH	
Yitu	Private	
Yixin	Private	

Source: U. S. Federal Register, A&S, and Aequitas Research.

4. **Concern for U.S. Companies:** The largest U.S. security company, Flir Systems (FLIR US), is much smaller than Hikvision and Dahua (Exhibit 3). To make things worse, only FLIR suffered a revenue decline among the top 10 global companies (Exhibit 6). Therefore, we believe that the real incentive behind the Entity List is the trade war rather than human rights. (detailed in the risk chapter below.) We also believe the action of the U.S. government reflects the competitive advantage of Chinese companies in the global market.

Exhibit 6: Top Global Security Companies (YoY Revenue Growth)

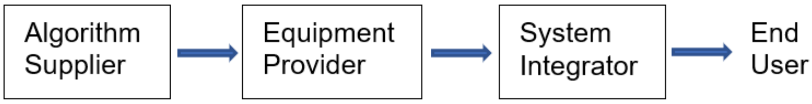


Note 1: Orange for China and blue for the U.S. Source: A&S December 2019 and Aequitas Research.

C. Leading Chinese Companies

1. **Value Chain of Surveillance Companies**

Exhibit 7: Video Surveillance Companies in Supply Chain

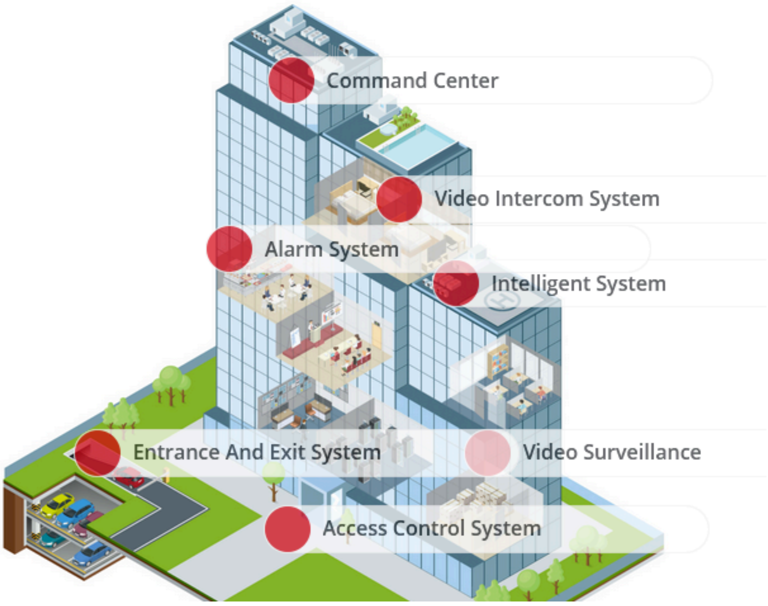


Source: Aequitas Research.

There are three main types of companies, which call themselves "video surveillance solution providers" (Exhibit 7).

(1) Algorithm suppliers. They provide key software to surveillance systems. For example, Megvii Technology (1737211D HK) (旷世科技) on the U.S. blacklist (Exhibit 1) provides facial recognition. Equipment providers can do the algorithm themselves, but some algorithm suppliers do have better technologies.

Exhibit 8: Building Solution


Command Center
Video Intercom System
Alarm System
Intelligent System
Entrance And Exit System
Video Surveillance
Access Control System

Source: Hikvision

(2) Equipment providers. They integrate the whole video surveillance system (Exhibit 8), from the front-end (such as camera and sensor) to the back-end (such as storage), from hardware to software. Of course, they can also sell these parts separately (Exhibit 9). Typical companies are the top three Chinese companies, i.e., Hangzhou Hikvision (002415 CH), Zhejiang Dahua Technology A (002236 CH), and China Transinfo Technology (002373 CH). They are experienced in all parts and know how to integrate all parts together. Therefore, they can hardly be substituted by companies, which are good at one part.

Exhibit 9: Camera

Source: Hikvision

(3) System integrator. Typically, they install already-integrated systems provided by equipment suppliers according to clients' requirements. However, they call themselves "system integrators". The market is over-competitive due to a low technological entry barrier. A typical company is Beijing E Hualu Info Tech A (300212 CH).

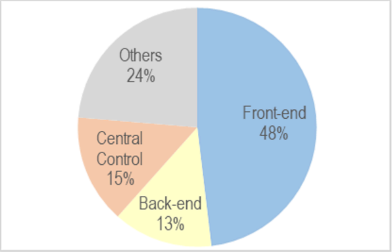
We believe that currently the barrier to entry is highest for equipment providers among others. Furthermore, the top-three Chinese surveillance companies are all equipment providers. Therefore, we focus on the top three below.

2. Background of Leading Companies

(1) Hikvision

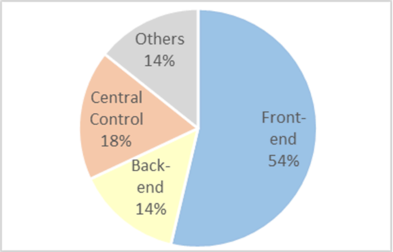
Hikvision was founded in 2001 and was listed in the Shenzhen Stock Exchange (SZSE) in 2010. The company entered into the video surveillance market in 2003 and has had the global largest market share since 2011 according to IHS Markit or since 2016 according to A&S. The state-owned China Electronics Technology Group Corporation (CETC) is the largest shareholder and has 41% of Hikvision's shares. CETC is a supplier of the People's Liberation Army. We understand some securities authorities may possibly ban investments in or recommendations on this kind of companies. However, many investment funds headquartered in North America and West Europe hold shares of Hikvision. Please check the exact rules with the authorities in your country.

Exhibit 10: Hikvision Revenue Breakdown



Note: 1H2019. Source: Hikvision

Exhibit 11: Hikvision Gross Profits Breakdown



Note: 1H2019. Source: Hikvision

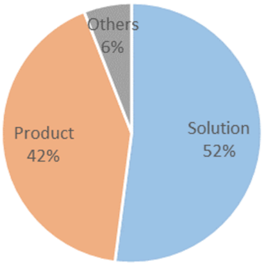
The technology trend is as follows: More data processing functions have been moved from control center to front-end. Cameras transmit processed data to the control center. Therefore, camera has the key technology and is the most important equipment among all. As the world's largest surveillance company, halves of Hikvision's revenues and gross profits are from the front-end, a.k.a. camera (Exhibit 10, 11).

For the same reason, the supply of core chip, the graphics processing unit, is the key risk for surveillance equipment providers. This will be detailed in the risk chapter below.

(2) Dahua

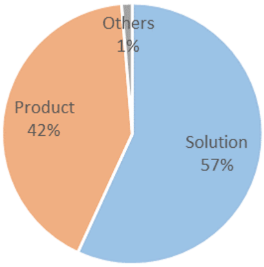
Dahua was founded in 2001 and listed in SZSE in 2008. The company is the second largest market share in the world in accordance with the 2019 A&S list. Mr. Fu Liquan (傅利泉) is the largest shareholder and owns 36% of Dahua. Furthermore, all shareholders, who own more than 1% shareholdings, are natural persons. We believe the company is NOT state-owned.

Exhibit 12: Dahua Revenue Breakdown



Note: 1H2019. Source: Dahua

Exhibit 13: Dahua Gross Profits Breakdown



Note: 1H2019. Source: Dahua

Dahua breaks down its business lines in a different manner from Hikvision (Exhibit 12, 13). Leading equipment providers, such as Hikvision (Exhibit 8) and Dahua (Exhibit 12) can provide the full surveillance systems, which are already integrated systems. Therefore, in many occasions, the equipment providers merely leave the installation jobs to the so-called "system integrators".

(3) TransInfo

TransInfo was founded in 2002 and listed in SZSE in 2010. In November 2017, TransInfo acquired 100% of Uniview, which is the 7th largest security company globally in 2019. Alibaba (BABA) acquired 15% shareholdings of TransInfo in May 2019. Thereafter, the largest shareholder, Mr. Xia Shudong (夏署东)'s shareholdings declined to 16%. This is not a state-owned company either. More importantly, neither Uniview nor TransInfo is in the U.S. Entity List. We are impressed that Alibaba could foretell that the Trump administration will not add Uniview, the No. 3 Chinese security company, to the Entity List.

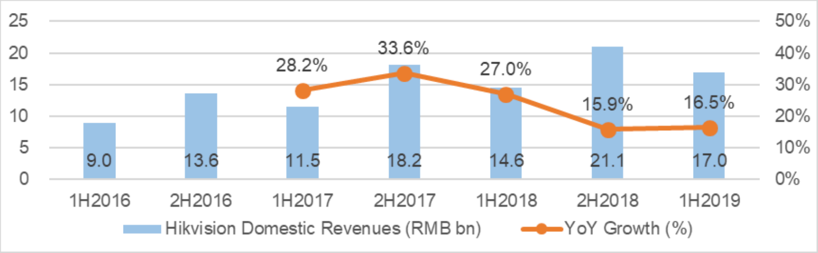
TransInfo is a typical Chinese surveillance company, which focuses on the domestic market (Exhibit 4). Below we compare domestic performance to overseas performance for the top three companies.

3. Domestic vs. Overseas Revenues

(1) Hikvision

In December 2019, the board secretary (equivalent to investor relations manager) of Hikvision, Ms. Huang, acknowledged that Hikvision's performance declined in the U.S. and She also expected the overseas growth will just be "stable", as there are "different obstacles in different countries".

Exhibit 14: Hikvision Domestic Revenues

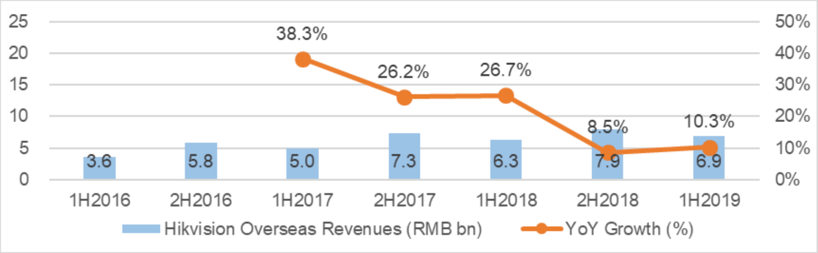


Source: Hikvision and Aequitas Research.

However, we believe Hikvision's total revenue performance will grow by two-digit in 2020.

- Domestic market will drive the growth, as domestic revenues were 2.5 times overseas in 1H2019 (Exhibit 14, 15).
- The revenue growth in both domestic and overseas markets stopped declining and started recovering in 1H19 (Exhibit 14, 15). We believe domestic revenues will grow by 18% in 2020, riding on the Snow Bright Project, but overseas revenues will grow by only 10% in 2020 according to the management comments.

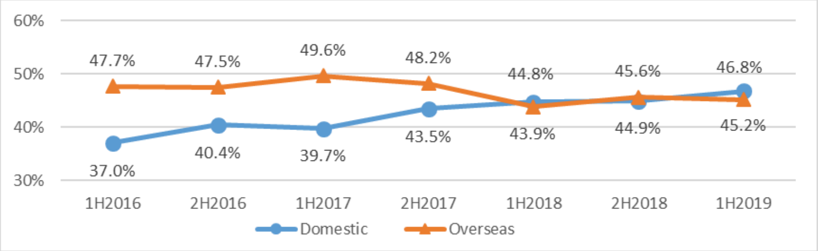
Exhibit 15: Hikvision Overseas Revenues



Source: Hikvision and Aequitas Research.

- The domestic gross margin caught up with the overseas gross margin in 2018 and was 1.6 percent points higher than the overseas margin in 1H19 (Exhibit 16). Therefore, we believe overseas gross profits will be less important in 2020.

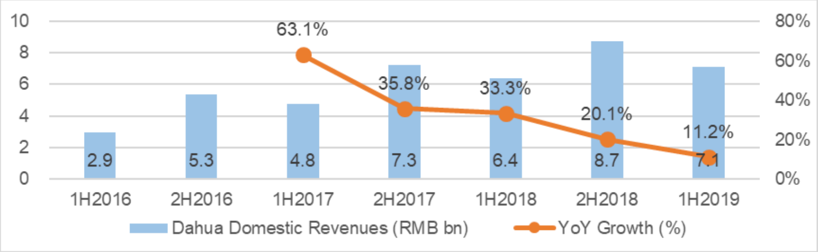
Exhibit 16: Hikvision Gross Margins, Domestic vs. Overseas



Source: Hikvision and Aequitas Research.

(2) Dahua

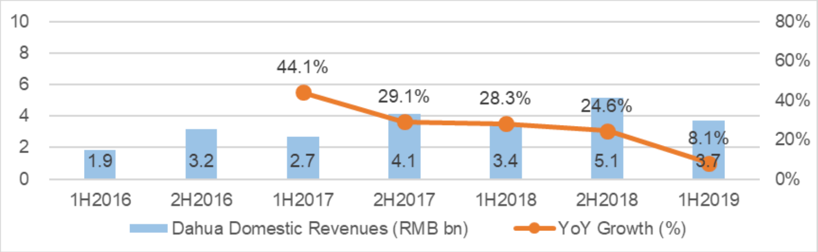
Exhibit 17: Dahua Domestic Revenues



Source: Dahua and Aequitas Research.

- In 1H2019, Dahua's revenues from overseas accounted for 34% of total revenues (Exhibit 17, 18), compared to 29% for Hikvision.

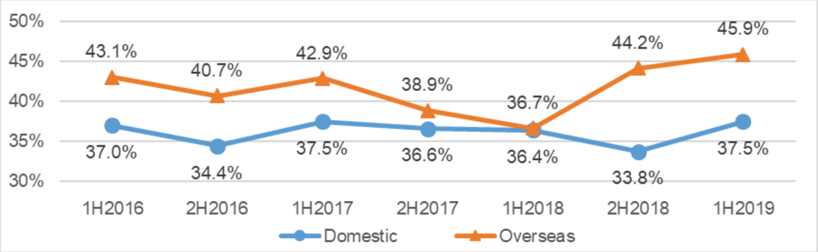
Exhibit 18: Dahua Overseas Revenues



Source: Dahua and Aequitas Research.

- In Dahua, the gross margin of overseas business has been significantly higher than the gross margin of domestic business (Exhibit 19).

Exhibit 19: Dahua Gross Margins, Domestic vs. Overseas

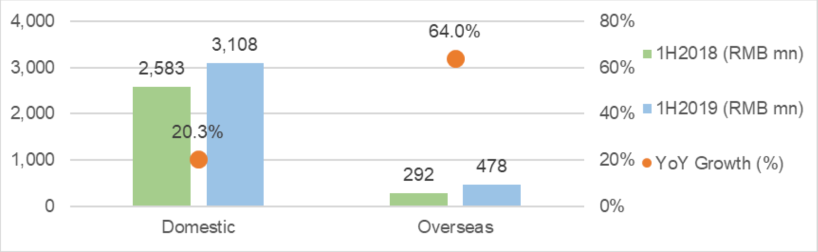


Source: Dahua and Aequitas Research.

Please note that the trade war started in June 2018. Dahua's recovery reflects that the U.S. is not significant to the whole overseas market for Chinese companies.

(3) TransInfo

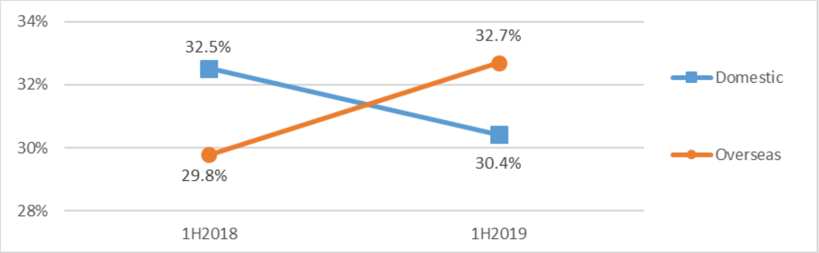
Exhibit 20: TransInfo Domestic and Overseas Revenues



Source: TransInfo and Aequitas Research.

For TransInfo, the overseas market is not important at all, despite the facts that (1) revenue from overseas grew 64% YoY in 1H2019 (Exhibit 20) and (2) gross margin from overseas business improved 3 percentage points YoY in 1H2019 (Exhibit 21). After all, revenues from overseas accounted for only 13% of total revenues.

Exhibit 21: TransInfo Gross Margins, Domestic vs. Overseas



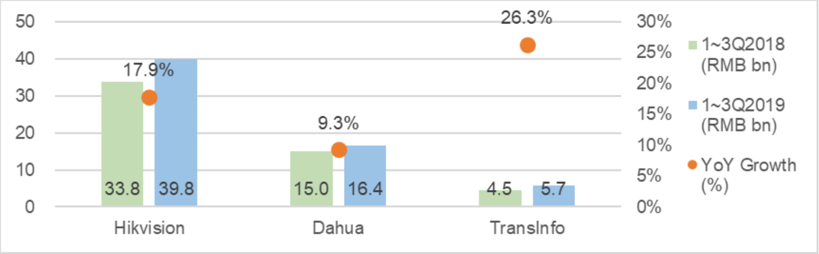
Source: TransInfo and Aequitas Research.

We believe the insignificant overseas exposure is the key reason that Uniview and TransInfo are not in the Entity List, despite the fact that Uniview, subsidiary of TransInfo provided solutions to the police in XUAR (source: www.doc88.com/p-1915064292186.html) Straightforwardly, we believe the U.S. Department of Commerce does not care whether a company helps violate human rights as long as the company does not export to the U.S.

4. Growth and Margin

We compared the top three security companies' financial performance in the first three quarters of 2019. For the financial performance below, "2019" represents "the first three quarters of 2019" and "2018" represents "the first three quarters of 2018".

Exhibit 22: Revenue Growth of Major Chinese Companies

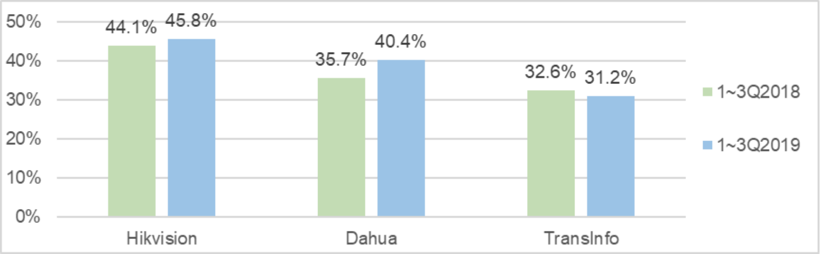


Source: Company data and Aequitas Research.

(1) Hikvision

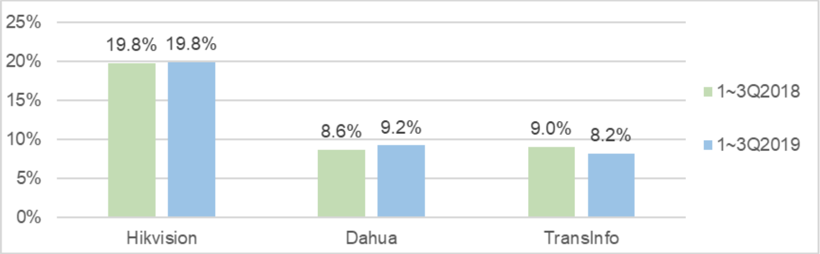
Hikvision has achieved double-digit revenue growth (Exhibit 22), improvement in gross margins (Exhibit 23), and a stable operating margin (Exhibit 24). We believe the trends will continue. The company's salespersons can always tell potential clients, 'we are the largest'.

Exhibit 23: Gross Margins of Major Chinese Companies



Source: Company data and Aequitas Research.

Exhibit 24: Operating Margins of Chinese Major Companies



Source: Company data and Aequitas Research.

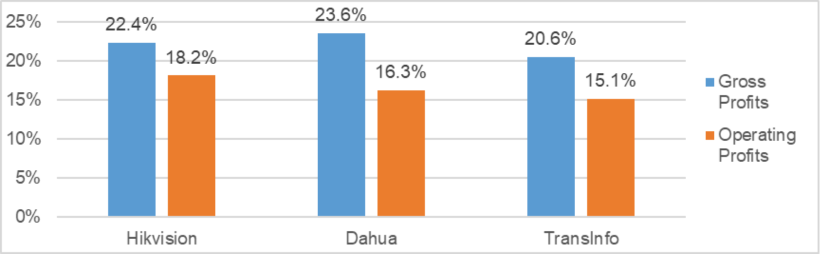
We believe Hikvision has an advantage in the "Snow Bright" project because Hikvision is a state-owned company. Government officials prefer state-owned companies despite the public bidding processes because the officials who operate the bidding will not be concerned that the opponents in the same local government will impeach them for accepting bribery. Such impeachment is equivalent to accusing another governmental department of committing a crime.

Additionally, Hangzhou Daily reported that Hikvision had sent 1,000 infrared thermometers to Wuhan, the epicenter of the coronavirus. Currently, Hikvision is working overtime to produce thermometers. We believe more “entrance”, such as railway stations and even office buildings, will need infrared thermometers.

(2) Dahua

Non-state-owned Dahua and TransInfo chose the opposite strategies – Dahua pursues high margin, while TransInfo pursues high growth. We believe both of them are right for their own sizes.

Exhibit 25: YoY Profits Growth Rates in 1~3Q2019 over 1~3Q2018



Source: Company data and Aequitas Research.

Dahua improved its margins at the expense of growth rate. Revenues grew by single-digit (Exhibit 22), but the gross margin improved 4.7 percentage points (Exhibit 23). As a result, gross profits increased by 24% YoY in 2019, higher than 22% for Hikvision (Exhibit 25). "Sales and marketing expenses as a percentage of total revenues" rose 1.7 percentage points in 2019. Even so, operating profits increased by 16% YoY in 2019. The two-digit growth rates of profits were far from “slow”.

We believe margins are important for Dahua to compete with Hikvision in the long run. Currently the market size is expanding. However, low margin is vulnerable to a potential price war when the market is mature in the future.

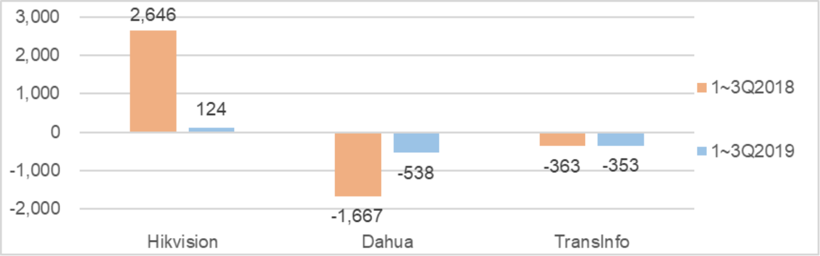
(3) TransInfo

On the contrary, TransInfo boosted its growth at the expense of margins. TransInfo’s revenues grew by 26% YoY in 2019 (Exhibit 20), higher than 18% for Hikvision and 9% for Dahua. Both of TransInfo’s gross margin and operating margin declined. We believe “growing first” is the right decision, as TransInfo’s revenues were only 35% of Dahua and 14% of Hikvision.

5. Operating Cash Flows

Dahua improved not only margins but also operating cash flows. Dahua's operating cash outflows decreased by 68% YoY (Exhibit 26). We believe the company will stop cash bleeding in 2020.

Exhibit 26: Operating Cash Flows



Source: Company data and Aequitas Research.

On the contrary, Hikvision's operating cash inflows plunged by 95% YoY (Exhibit 24). The company explained that it needed to reserve more parts (for the supply ban from the U.S.).

TransInfo's operating cash outflows were stably negative. Furthermore, TransInfo's revenues were only 1/3 of Dahua's, but cash outflows were 2/3 of Dahua's.

In summary, among the top three Chinese security companies, Dahua is the only one that improved both the operating margin and operating cash flows. According to the valuation ratios below (Exhibit 26), we believe the market overly focuses on the revenue growth.

D. Key Risks

1. **U.S. Entity List**

The U.S. Department of Commerce added 28 Chinese entities to the Entity List on October 9, 2019. Most of the entities are Chinese government bureaus in the Xinjiang Uighur Autonomous Region (XUAR) of China, but there are also 8 Chinese surveillance companies in the List (Exhibit 1). The U.S. authority accused the surveillance companies above of posing "a significant risk of being or becoming involved" in human rights violations against Uighurs, Kazakhs, and other members of Muslim minority groups in the XUAR area.

On one hand, we believe surveillance companies should know their equipment are used by the police in the XUAR area at the bidding stages. The companies should also know they cannot control how the police will use the equipment. On the other hand, we believe it is unfair to hold double standards for different Chinese companies and companies from other countries.

(1) Uniview: We found the Chinese company Uniview (a subsidiary of TransInfo (002373 CH)) provided surveillance equipment to 330 local polices of China, including at least polices in three cities of XUAR. These cities are Urumqi, Karamay, and Khotan. (source: http://www.doc88.com/p-1915064292186.html). However, the U.S. did not add Uniview to the Entity List. We believe this exemption is because Uniview does not have significant overseas sales (Exhibit 2) and does not impact the US' market and surveillance companies.

(2) Bosch: In August 2018, Germany headquartered Bosch Security System, the fourth largest security company in the world, sold smart arms lockers (small gun warehouses with access control systems) to the police in Shandong Province of China. (source: https://www.bidcenter.com.cn/newscontent-56197436-4.html) There are more than half million of Muslins in Shandong Province. Any criticism on Bosch Security?

(3) BMW: There are 160,000 Muslims in Shanghai. Many policemen maintain order on every religious activity in Shanghai every year. In 2010, the police in Shanghai purchased 22 sedans of BMW for the World Expo at the total value of RMB11 million, equivalent to US$1.6 million (Exhibit 27, 28). This time, Journalists from many countries can directly see the BMW sedans at the World Expo Shanghai instead of checking the governmental procurement lists. Has BMW been criticized in any media or by any U.S. ministry?

Exhibit 27: BMW Sedans

警察
POLICE
沪E9225

Source: focus.cnhubei.com/ctdsb/ctdsbsgk/ctdsb20/201003/t1046806.shtml

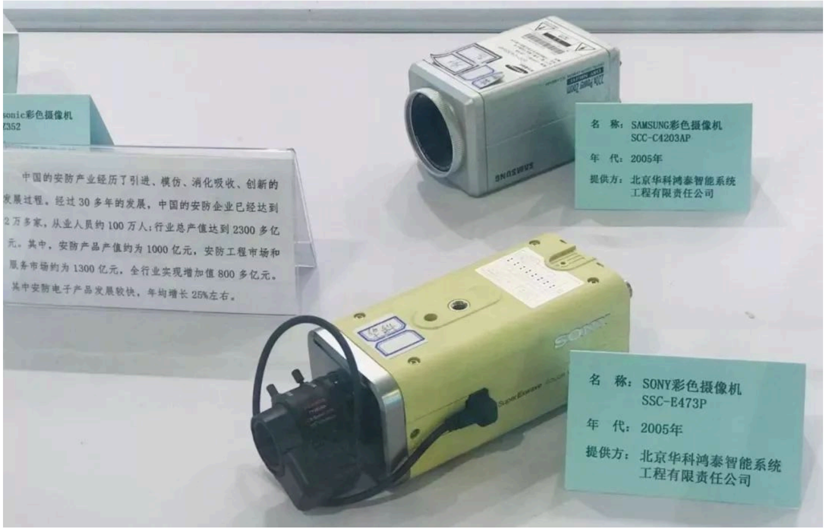
Exhibit 28: BMW Sedans

POLICE
沪·E9214警

Source: Ibid.

(4) Sony and Samsung: No domestic companies were able to produce high-definition surveillance before Hikvision began to provide in 2002. So how could the Chinese government monitor target people at any time when policemen were not there? The "Beijing Security 40 Years Exhibition" provided the answer. Sony, Samsung, and other imported products worked (Exhibit 29). Have the U.S. authorities punished them?

Exhibit 29: Sony and Samsung Cameras Used in Beijing


sonic彩色摄像机
Z352
中国的安防产业经历了引进、模仿、消化吸收、创新的
展过程。经过 30 多年的发展，中国的安防企业已经达到
2 万多家，从业人员约 100 万人；行业总产值达到 2300 多亿
元。其中，安防产品产值约为 1000 亿元，安防工程市场和
服务市场约为 1300 亿元，全行业实现增加值 800 多亿元。
其中安防电子产品发展较快，年均增长 25%左右。
SAMSUNG
名　称：SAMSUNG彩色摄像机
SCC-C4203AP
年　代：2005年
提供方：北京华科鸿泰智能系统
工程有限责任公司
SONY
名　称：SONY彩色摄像机
SSC-E473P
年　代：2005年
提供方：北京华科鸿泰智能系统
工程有限责任公司

Source: www.sohu.com/a/328821404_470081

The police in China procure from many suppliers headquartered overseas, including but not limited to Sony, Samsung, BMW, and Bosch Security. For example, the Korean SK Group is an investor of private Megvii in the Entity List (Exhibit 5).

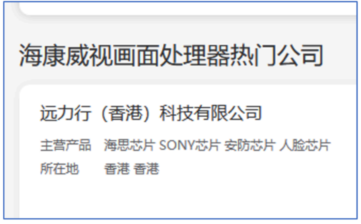
Institutional investors can surely have their ethical standards and boycott all the suppliers to the police in China. The China government's procurements are public (www.ccgp.gov.cn). Here we just hope investors to be fair to all the suppliers, not merely to focus on what the U.S. government or the media focuses on.

2. The Competitor - HiSilicon of Huawei

The U.S. Entity List does not forbid U.S. corporations or persons from buying solutions from the blacklisted Chinese equipment providers but from providing parts to them.

We believe the parts here suggests the SoC (System on Chip) chips, as they have the highest entry barrier among all technologies in video surveillance equipment. There are three major producers in the U.S., i.e., Nvidia Corp (NVDA US), Ambarella Inc (AMBA US), and Texas Instruments (TXN US).

Exhibit 30: A Sample of Hikvision's GPU Agent Supplier



海康威视画面处理器热门公司

远力行（香港）科技有限公司

主营产品　海思芯片 SONY芯片 安防芯片 人脸芯片

所在地　香港 香港

Hikvision GPU suppliers

YLX (Hong Kong) Tech Limited

Products: HiSilicon chips, Sony chips, security chips, facial recognition chips.

Location: Hong Kong

Note: GPU for graphics processing unit. Source: www.china.cn/huamianchuliqi/hikvision/

As mentioned above, Hikvision's operating cash flows plunged 95% for hoarding parts from the U.S. in case the formal ban of parts supplies. Are there any Chinese domestic providers? There is a big one: HiSilicon (海思) (Exhibit 30). HiSilicon is the largest surveillance chip supplier in China and Hikvision is the largest external client of HiSilicon.

However, there is a significant concern for HiSilicon's Chinese clients. HiSilicon is 100% owned by Huawei and Huawei is also a surveillance equipment provider. In May 2018, Mr. Peng Xiaodong (彭晓东), Huawei's head of China Sales, told A&S, 'Huawei's security business planned to be Global No. 3 in 3 years.' It should be realized in 2021. Huawei did not bluff. Huawei's security revenues increased 450% YoY in 1H2019, though we do not know the exact revenues.

So, the current competitive situation is:

(1) Huawei is the only part provider of China that can produce the core chips with the quality and the quantity closest to the U.S. peers.

(2) All other Chinese equipment providers mainly use HiSilicon (Huawei) chips in China.

(3) All other Chinese equipment providers import a small part of U.S. chips to prevent potential price threat from HiSilicon (Huawei).

(4) There are many small Chinese chip suppliers, but major equipment providers dare not risk them in the competition with Huawei.

Huawei was on the U.S. Entity List earlier, but in the case of surveillance, we believe, Huawei should deeply appreciate the Trump administration. The new Entity List will tip the balance in the chip supply. Huawei may possibly take the whole China surveillance market if other equipment providers lose the key chip support from the U.S.

“China is by far the largest single market probably accounting for 35 to 40 percent of world demand”, A&S commented in its 2019 security report. In short, the new Entity List will help Huawei drive U.S. suppliers out of “the largest single market”.

As we know, Major equipment providers, such as Hikvision and Dahua, started developing the core chips by themselves. However, they may not live to see the self-sufficient day, if the U.S. continues to “help” Huawei to take the market.

Some good news came for Chinese surveillance companies. The U.S. and China signed a "phase-one deal" on January 15, 2020, which means a ceasefire of the trade war. The deal does not mention the Entity List, but it is a positive signal. We notice that Huawei was given a “temporary general license” after the company was blacklisted, so that Huawei can still “temporarily” obtain parts from U.S. suppliers. The precedent suggests that Chinese companies on the Entity List may obtain de facto supplies.

3. **Coronavirus**

The Wuhan coronavirus is spreading. According to the experience of the SARS (Severe acute respiratory syndrome) in 2002-2003, this kind of viral respiratory disease will be contained when the temperature rises. On July 9th, 2003, the WTO (World Health Organization) declared that the SARS, which broke out in November 2020, was completely contained.

Therefore, we expect most local governments will focus on fighting the coronavirus and will not have spare energy to install more surveillance systems in the first half of 2020.

However, we expect local governments will attach more importance to video surveillance after the event. The municipal government of Wuhan, which is the epicenter of the virus outbreak, is preventing citizens from leaving the city. The government shut down the airport, railway stations, and highways. However, so far, the government finds 5 million citizens have left Wuhan versus 9 million staying in the city. On the ground, we know many drivers charged extremely high prices and took citizens out of Wuhan. These drivers know how to use rural roads and avoid the coverage of the existing surveillance system. Many other municipal governments are facing the same situation. The rural roads the drivers used are exactly what the "bright snow" project aims to cover.

E. Valuation

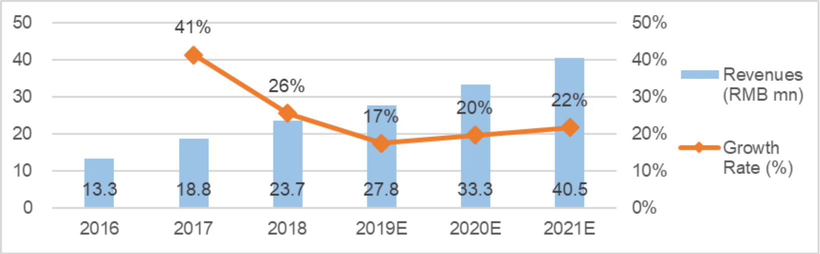
Exhibit 31: Ratios for Valuation

Company	EV/Revenues		P/S		EV/EBITDA		P/E	
	2020	2021	2020	2021	2020	2021	2020	2021
Hikvision	4.5x	3.7x	4.7x	3.9x	18.8x	15.4x	21.3x	17.4x
Dahua	1.9x	1.6x	1.9x	1.5x	14.3x	11.8x	15.8x	13.0x
TransInfo	3.0x	2.4x	3.0x	2.5x	23.8x	21.0x	27.7x	22.8x
GRG Banking	2.8x	2.4x	3.0x	2.6x	N/A	N/A	22.8x	19.1x
e.Hualu	5.7x	4.5x	4.6x	3.6x	17.4x	12.7x	26.3x	20.7x
PCITECH	2.2x	1.8x	2.1x	1.7x	26.8x	17.8x	25.1x	18.4x
Gosuncn	2.6x	1.8x	2.6x	1.8x	N/A	N/A	21.1x	29.3x
Average	**3.2x**	**2.6x**	**3.1x**	**2.5x**	**20.2x**	**15.7x**	**22.9x**	**20.1x**

Source: Bloomberg analyst consensus.

We compare 7 video surveillance companies listed in mainland China (Exhibit 31). We believe Dahua is undervalued, as the market only focuses on historical revenue growth.

Exhibit 32: Dahua's annual Growth Rate



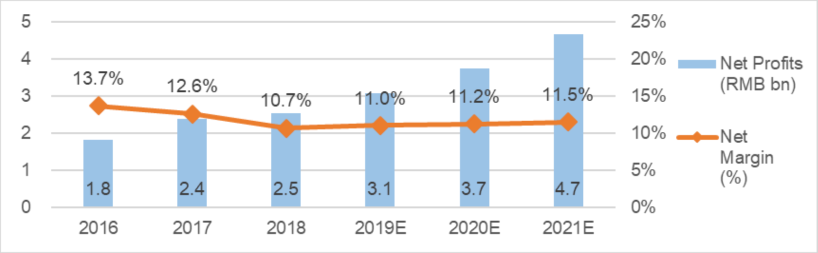
Source: Dahua and Aequitas Research estimates.

1. We believe Dahua's revenue growth will reverse in 2020 and 2021(Exhibit 32).

(1) "Snow Bright": The governmental "snow bright" project will demand more video surveillance equipment. However, please note that the demand will start in 2H2019, but not 1H2019. We believe local government will be busy fighting the coronavirus in 1H2019. We also believe local governments will be more than willing to follow "snow bright" to cover suburban areas with video surveillance, because they must find it is hard to prevent population from flowing from city to city through suburban areas.

(2) Market Position: Dahua is the second largest surveillance company in China (Exhibit 3). The 3rd Chinese company Uniview's revenues was only 17% of Dahua. We believe China is almost a duopoly market. In other words, we believe the demand from "snow bright" will mainly be taken by Hikvision and Dahua. Overseas brands, such as Sony and Samsung, has already been substituted by domestic brands. We also believe the Chinese government will block the re-entry of overseas brands for national security reason.

Exhibit 33: Dahua’s annual Growth Rate



Source: Dahua and Aequitas Research estimates.

2. We believe the net margin will be stable in 2020 and 2021 (Exhibit 33).

(1) Gross Marin: Dahua’s gross margin improved 4.7 percentage points in 1~3Q2019 over 1~3Q2020, as the company moved its focus from revenue growth to margin. We believe Dahua’s gross margin will reach the level of Hikvision, i.e., 46%, in 3~4 years versus the current level 40% (Exhibit 23) due to the revenue growth we expect above. Non-core parts are always procured at lower prices when the volumes become larger.

(2) Sales and marketing expenses: We believe “sales and marketing expenses as % of total revenues” will rise slightly in 2020 due to the competition with Hikvision. However, we believe the competition will be limited, as China is almost a duology market.

(3) Research and development expenses: Dahua is actively researching and developing the core chips, or more accurately, the SoC (System on Chip) chips with high-quality GPU (Graphics Processing Unit) functions. Currently the chips are supplied by the competitor Huawei and the overseas suppliers that will be or nominally have been banned by the U.S. government. Higher the quality of the self-sufficient chips, the lower the costs in the long run. Therefore, we believe the “research and development expenses as % of total revenues” will also rise slightly in 2020.

In summary, we believe earnings per share will grow 22% in 2020 and 25% in 2021 due to the accelerating revenues and the stable margin. We conclude a P/E ratio of 16.2x for 2020 versus 15.8x from the market consensus. Whichever ratio is used, we believe Dahua is undervalued.

F. Conclusion

We believe the "Bright Snow" project will provide Chinese surveillance companies with a promising domestic market. Over 2,000 county governments need surveillance systems for public places. We believe governmental usage will educate non-government institutions in these counties that surveillance is a solution for safety. We also believe the coronavirus event proves the necessity of “Bright Snow”.

We believe the market undervalues Dahua, as the market bases the value on its revenue growth. However, we notice that Dahua has the highest improvements in margin and operating cash flows among the top-three Chinese companies.

We found the U.S. Entity List only pays attention to the companies that raise the U.S. trade deficits. We believe all investors have their own ethical standards, but none of them have to be the tools of a political election or commercial competition.

G. Appendix

Exhibit 34: Comparison of Global Rank, Entity List, and MSCI

Company	A&S Global Rank	New in Entity List	MSCI China A-Share	Ticker
Hikvision	1	Yes	Yes	002415 CH
Dahua	2	Yes	Yes	002236 CH
Uniview *	7	-	Yes	002373 CH
Tiandy **	9	-	-	000836 CH
Infinova	14	-	-	002528 CH
Kedacom	17	-	-	603660 CH
Megvii	19	Yes	-	Private
Raysharp	22	-	-	833645 CH
TVT Digital	26	-	-	002835 CH
Wanjiaan	32	-	-	834520 CH
Zeno	44	-	-	837181 CH
iFLYTEC	-	Yes	Yes	002230 CH
GRG Banking	-	-	Yes	002152 CH
Meiya Pico	-	Yes	-	300188 CH
SenseTime	-	Yes	-	Private
Yitu	-	Yes	-	Private
Yixin	-	Yes	-	Private

* Subsidiary of TransInfo. ** Subsidiary of Futong Xinmao. Source: A&S top-50, U. S. Federal Register, and Aequitas Research.

Disclosure & Certification

- I/We have no position(s) in the any of securities referenced in this insight
- Views expressed in this insight accurately reflects my/our personal opinion(s) about the referenced securities and issuers and/or other subject matter as appropriate.
- This insight does not contain and is not based on any non-public, material information.
- To the best of my/our knowledge, the views expressed in this insight comply with Singapore law as well as applicable law in the country from which it is posted
- I/We have not been commissioned to write this insight or hold any specific opinion on the securities referenced therein
- I/We have signed the Insight Provider Agreement and this insight does not violate any of the terms specified therein.

— Ming Lu (31 Jan 2020)

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- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: China
- Sectors: Consumer Discretionary, Industrials

Content Verticals

- Equity Bottom-Up, Thematic (Sector/ Industry)

Thematic (Sector/Industry)

China Auto Parts A Shares: Parts Of The Future

By Victoria Li | 27 Mar 2020

EXECUTIVE SUMMARY

China has been the fastest growing auto market in the world. Over the last 2-3 years China's auto component industry is going through a tumultuous period - not only due to the volatility in demand (due to the auto downturn last year and corona-related lockdowns this year), but also due to two mega-trends that are providing risks and opportunities to the industry - NEVs and autonomous driving. In addition, there are 3 other less-discussed drivers of change in the industry (emerging localization requirements, junior JV partners becoming leaders in their own right, international expansion). We look at the key A-share (MSCI A-share) listed players in the industry through the lens of these five trends/drivers of change.

We prefer Passenger vehicle(PV) part suppliers over commercial vehicle (CV)part suppliers. Among PV parts suppliers, our top buy is **Changzhou Xingyu (601799.CH)**, followed by **Ningbo Joyson Electronic(600699.CH),Fuyao Glass (600660.CH/3606.HK**) and **Huayu Auto (600741.CH)**. Our main underweight **Wanfeng Auto Wheel (002085.CH)**. In Commercial vehicle (CV) part segment, we prefer **Wanxiang Qianchao (000559.CH)** and **Linglong Tyre (601966.CH)**. We suggest investors to avoid **Weifu High-Tech (000581.CH).**

What's Original?

The recent tumult in the auto sector creates significant opportunities and risks for the companies involved - however companies/equities that are driving these trends are largely listed in the A-share market. Lack of market communication, limited financial and operational disclosure and low breadth of analyst coverage in these markets has meant that there are quite a few underappreciated companies in these markets which have been overlooked by international investors.

While companies like Ningbo Joyson and Fuyao Glass enjoy some international investor recognition, we believe under-appreciated stocks like Wanxiang Qianchao and Linglong tyres are not well-covered by the market and this report provides a rationale for investors to look further into those names. We also highlight the risks to (relatively) popular names like Weifu Hi-tech (due to structural issues in the industry) and Wanfeng Auto wheel (due to management pursuing non-core acquisitions).

Note that in this report, we do not include the possible impact from Coronavirus on the industry and companies. This is because 1) it's difficult to quantify the impact at current moment; 2) even if coronavirus impact might last for months, it's still a relative short period compared to the 5-year time horizon we focus on. In addition, once coronavirus is gone, market demand on autos and auto parts would rebound quickly.

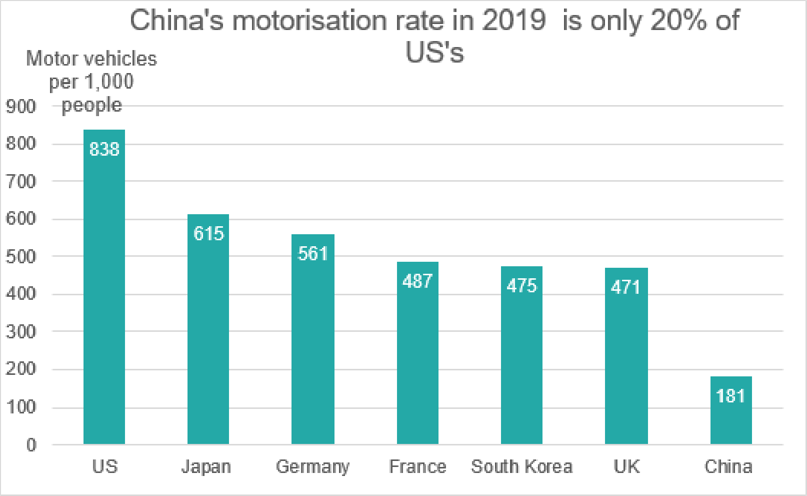
DETAIL

Investment Rationale

Growths of passenger vehicle components suppliers would outperform those of commercial vehicle components suppliers

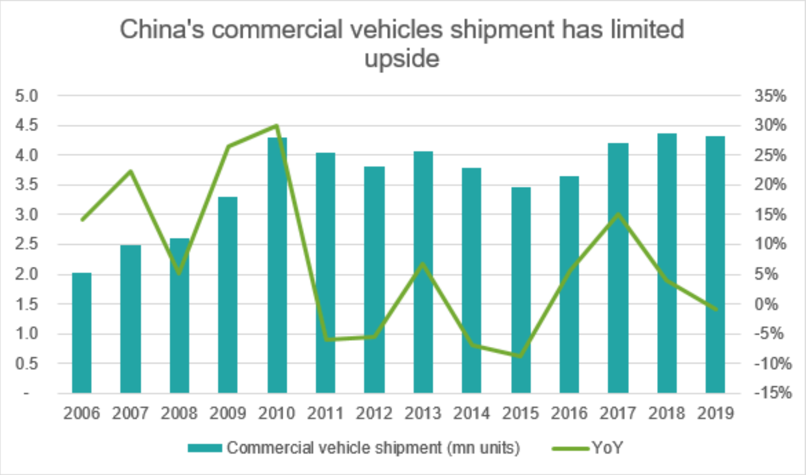
In 5 years' horizon, we believe auto suppliers with big exposure to passenger vehicles(PV) would outperform others exposed to commercial vehicles(CV). The key reasons are:

1) Although China's PV sector had negative growth in 2019, annual PV sales still have upside. This is because China's motorisation rate remains low compared with other major auto markets/countries. **We estimate China's PV shipment will grow at a CAGR of 5% during 2020-2025E**, with growing disposable income per capita and improving car autonomy functions.

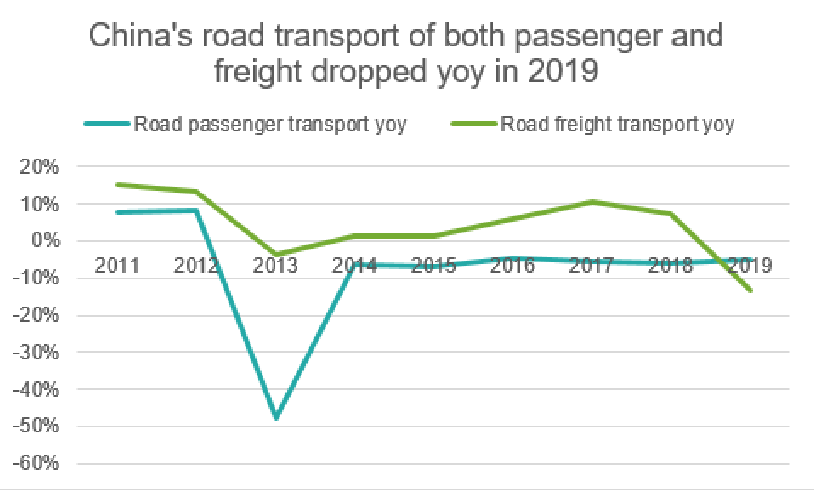


Sources: Wikipedia

2) **Commercial vehicle market,especially truck, is matured in China**. Current market demand is mainly from replacement. In China, commercial vehicle demand is mainly from logistics (including cargos and passengers) and construction. China has already experienced peak period of infrastructure construction, which it would not be able to repeat over the next 5 years. Vehicle demand from freight transport might be boosted in the next two years due to China's new toll road charge policy which took effect on 1st Jan 2020 (please refer to Sinotruk(3808.HK): New Engine, New Life). However, we estimate China's road freight transport might have peaked in 2018, due to Central government encouraging on rail freight transport. China's road freight transport declined 13% yoy in 2019. Vehicle demand from passenger transport goes down y/y since China's HSR (High Speed Railway) network is formed.



Sources: CAAM



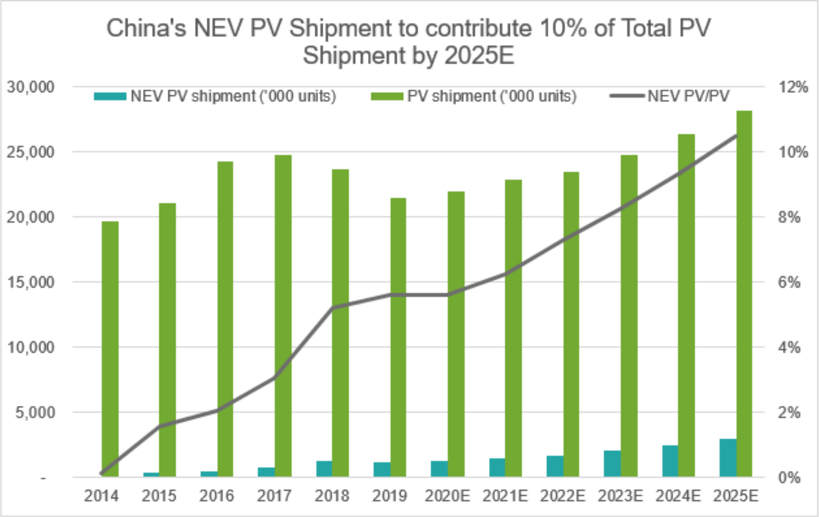
Sources: China's statistics Bureau

Demand on CV parts would be stable with product upgrading driven by higher national emission standards

NEV, V2X and autonomous driving are also expected to happen in commercial vehicle sector, but their commercialization is far behind that of PV sector.In the next few years, key change in CV market is the upgrade of exhaust emissions standard, which is triggering replacement demand on engines and related components. State Council requires non-road machines to use National IV engines from 2021. Heavy duty vehicles shall use National VI diesel engines from July 2019. Light duty vehicles will use National VI diesel engines from July 2020. **This trend is driving ASP (and margins) of related components suppliers, such as Weichai Power (000338.CH/ 2338.HK, heavy duty truck engines) and Weifu Hi-Tech (000581.CH, diesel engine fuel injection system).**

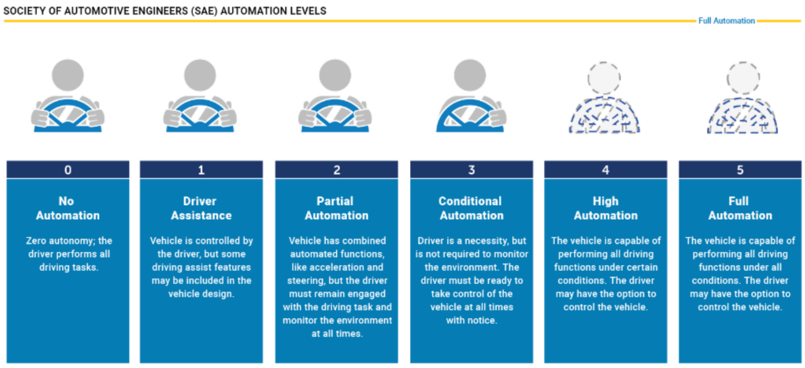
Key drivers of the auto components industry:

1) **Increasing share of New Energy Vehicles:** With support from the governments of all major countries, **it's clear that NEV (New Energy Vehicle) would dominate the market in the future.** Increasing sales proportion of NEV is leading to 1) Demand from engines, gearbox and emission control is changing to demand from batteries, motors and related control systems; 2) Reducing car weight by using lighter alloy or non-metal materials, such as increasing the use of glasses, replacing steel parts with aluminum alloy parts and magnesium alloy parts, etc. In this environment; traditional OEMs have to reduce their in-house engine productions and purchase batteries, motors and related management systems from third-party suppliers. Traditional steel parts suppliers would loss market to glass suppliers and aluminium and magnesium alloy or other lighter parts suppliers. **Typical beneficiaries include Fuyao Glass (600660.CH/ 3606.HK, auto glass), Huayu Auto(600741.CH,motor and control system), and Wanfeng Auto Wheels (002085.CH, aluminium and magnesium alloy parts).**



Sources: CAAM, Victoria Li estimates

2) **Rise of autonomous driving: China officially set a time line for auto sector's autonomous driving**, which requires mass production of Conditional Automation (CA) cars, i.e. L3 level cars, and bringing to market of High Automation (HA) cars, i.e. L4 level cars, by 2025. It also requires to complete LTE-V2X(vehicle to everything) coverage, and apply 5G-V2X gradually in cities and expressways, by 2025. (please refer to China Auto: Autonomous Driving Is Officially on the Way). In this trend, demand on new auto parts are created, such as sensors, cabin electronics and softwares. Typical **beneficiaries include Changzhou Xingyu (601799.CH, smart auto light), Joyson (600699.CH, active auto safety system, car connect), Fuyao Glass (600660.CH/3606.HK, HUD glass), and Huayu Auto (600741.CH, millimeter radar).**



0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Sources: nhtsa.gov

3) **Import substitution is opening auto automation parts market to local suppliers:** 2020 might be a milestone year for some local auto parts suppliers. Tesla Shanghai targets to raise its auto parts localisation rate from 30% at end-2019 to 80% by mid-2020 and then 100% by the end of 2020. Tesla Shanghai came on steam at end-2019, and is expected to deliver

100,000 Model 3 cars. Based on related auto parts companies' announcements by the end of the date, the biggest beneficiary of Tesla orders is Ningbo Xusheng (603305.CH). While suppliers who are already in Tesla's supply chain include **Joyson (600699.CH, auto safety products) ,Fuyao Glass (600660.CH/3606.HK, auto glass), Huayu Auto (600741.CH, car seats)** ,**Wanfeng Auto Wheels (002085.CH, magnesium alloy parts).**

4) **JV partners becoming technology leaders in their own right:** Companies that were junior JV partners of global component manufacturers buying out their JV partners. Some are buying global technology leaders to leverage their technology in China. **Joyson (600699.CH, auto safety products) ,Fuyao Glass (600660.CH/3606.HK, auto glass), Huayu Auto (600741.CH, auto lights) and Wanfeng Auto Wheels (002085.CH, magnesium alloy parts)** are exposed to this theme

5) **International expansion:** Chinese auto parts companies are using their new-found manufacturing prowess and technology expertise to expand into international markets. The companies that are exposed to this theme include C**hangzhou Xingyu (601799.CH)**, **Fuyao Glass (600660.CH/3606.HK**), **Wanxiang Qianchao (002085.CH)** and **Linglong Tyre (601966.CH),**

Company Investment Rationale Summary

Changzhou Xingyu (601799.CH): As a pure auto lights supplier in China with 7.1% market share 2018, Xingyu is well positioned for the smart auto light trend in the sector. In 2019, its new product,LED ADB (Adaptive Driving Beam), started mass production with first order from FAW. In addition, pixel headlight(equivalent to Mercedes's Digital Light) is available for ordering. We estimate smart auto lights penetration increase would drive Xingyu's gross profit growth with a CAGR of at least 32% during 2018-2025E, assuming Xingyu's market share unchanged in auto lights market.Client base expansion/penetration increase might double Xingyu's revenue further.Overseas capacity expansion started with first plant being built in Serbia which would contribute Rmb117mn of pre-tax profit, equivalent to 13% of Bloomberg consensus pre-tax profit 2019E, in the near future.

Ningbo Joyson Electronic(600699.CH): Joyson is second largest auto safety system supplier in the world with 30% global market share, grew rapidly through M&A. It is well-positioned in L3 level autonomous driving technologies. It provides adaptive steering, driver management system in new steering system, first generation 5G-V2X product and latest IVI(In-Vehicle Infotainment) system which would drive Joyson's auto electronic sales to grow with a CAGR of 50% during 2019-2025E. Consolidation of recent acquired KSS and Takata assets would improve Joyson safety system segment's margins and increase Joyson's net profit by 30%. In addition, global active safety market size would double by 2025 from 2017, which would benefit Joyson.

Fuyao Glass (600660.CH/3606.HK):Fuyao is the second largest auto glass supplier in the world with 22% market share in 2017, and China's largest auto glass supplier with 63% market share. Wtih increasing penetration of new function glasses, we estimate Fuyao's auto glass ASP might increase from Rmb164/m2 in 2018 to Rmb195/m2 in 2025E, which would translate into 19% sales increase with higher margins, assuming no sales volume increase. Overseas plant utilisation rate improvement would raise Fuyao's profitability. In 2020, Fuyao estimates its US plants will sell 4.6-4.7mn sets of auto glass with same profitability of domestic plants. Fuyao entered aluminium auto trim parts business in 2019 by acquiring SAM (Germany aluminium auto trim parts supplier), domestic metal moulding company and aluminium smelting company as suppliers to SAM. As a major supplier to VW in Europe, we estimate SAM would gain orders from VW China as an entry point of exploring China market.

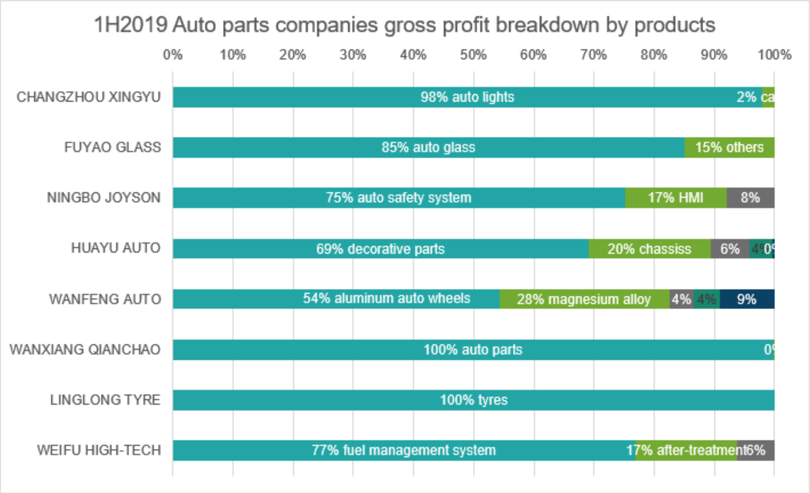
Huayu Auto (600741.CH): We appreciate Huayu's leading position and advanced technology among peers. However, as China's largest auto parts supplier with most comprehensive products and biggest client bases, its earnings growth rate will lag the three other peers mentioned above. This is mainly because all the fast growing product categories contribute only a very small percentage of the company's overall sales/profit. Also,Huayu has customer concentration risk due to non-compete with JV partners. Among its major 28 business contributors, 18 of them are JVs and associates with foreign partners.

Wanfeng Auto Wheel (002085.CH): Industry consolidation in the auto wheel segment might be triggered by recent auto market weakness (including outbreak of Coronavirus) and benefit Wanfeng. China's magnesium alloy per car remains low at 3kg per car in 2017. Assuming it reaches 20kg in 2025 and Wanfeng gains 20% market share, its annual sales from magnesium alloy parts would be Rmb2.24b, or 20% of Wanfeng's revenue in 2018. In Jan 2020, Wanfeng bought an aircraft manufacturing business from parent company. This worries us as it indicates that Wanfeng management might see limited upside on its alloy parts business, and want to explore another business area with which the management has had no experience before.

Wanxiang Qianchao (000559.CH): We believe the market has been underappreciating the investment potential of Wanxiang. It is China's universal joint and wheel hub leader who has been suffering from capacity bottlenecks. Wanxiang's product quality is well-known and appreciated but its production has been running behind the growth in customer demand. Wanxiang is expanding its wheel hub capacity to 50mn sets from 20mn sets by 2021, which could increase Wanxiang's revenue by 1.6 times with full capacity utilisation rate. Overseas capacity build started in 2020 to cover overseas demand. Capacity expansion might increase Wanxiang's debt load if its private placement fails. The only negative is its valuation - 2020E is demanding after earnings decline in 2018-2019E.

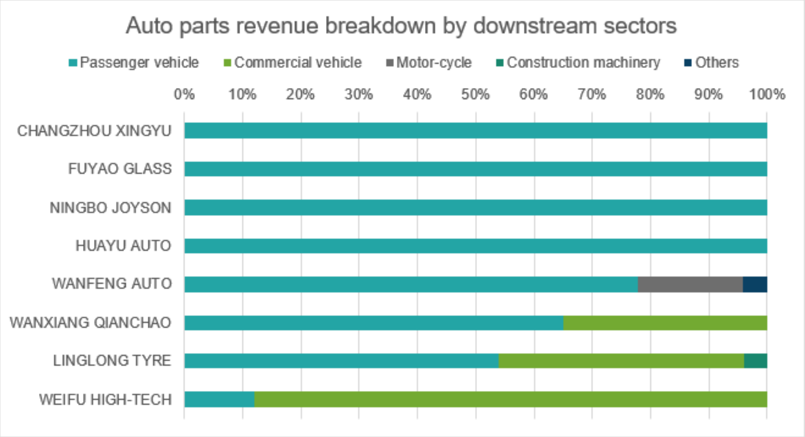
Linglong Tyre (601966.CH): With the market recognition on Linglong's product quality and attractive prices, Linglong is entering supply chains of JV OEMs such as VW, GM and Ford. As 85% of car owners choose same brands of tyres which are used on their new cars, entering OEMs' supply chain would deliver upside to Linglong's sales growth and stability over auto sector cycles. PV tyres have higher margin, whereby improve Linglong's product mix and hence its profitability. Overseas capacity expansion avoids negative impact from trade war. Besides Thailand plant, Linglong started a new plant in Serbia with would increase Linglong's net profit by 40% once its annual capacity is fully utilized.

Weifu High-Tech (000581.CH): China's leader in diesel engine fuel injection system faces downward risk as sector demand is structurally shrinking. It heavily replies on profit contribution from associates, whose net profit accounted for 63% of Weifu's net profit in 2018. To offset its main business risk, Weifu's exploring business opportunities in BEV powertrain system, in-wheel electric motor and fuel battery parts, which are still in early stage.



1H2019 Auto parts companies gross profit breakdown by products

Sources: company data



Auto parts revenue breakdown by downstream sectors

Sources: company data

Background

New Energy Vehicles are taking a bigger proportion of China's PV market. Autonomous driving became officially target for China's PV sector. These mean a period of fast change with plenty of opportunities and risks for China's auto parts sector. In this report, we help overseas investors explore the key auto parts suppliers in MSCI China A Index.

Valuation

In A-share market, P/E ratio is still considered as the most common valuation methodology. Among these eight stocks we cover in this report, Xingyu and Joyson are the most expensive ones among PV parts suppliers, while Wanxiang is the most expensive one among CV parts suppliers.

Xingyu's valuation might look a little bit aggressive compared to its peers. However, 1) we believe the market significantly underestimated Xingyu's earnings growths in the next few years. We estimate Xingyu's net profit CAGR would be 40% during 2020-2021E (without impact from Coronavirus, which is difficult to quantify at current moment), which indicates 20.8x P/E on 2020E and 14.8x P/E on 2021E. 2) Xingyu's 5-year historical P/E range is at 15-52x with average of 28.8x, which indicate its current valuation is at low range.

Joyson and Fuyao's P/E valuation looks attractive compared with its high earnings growth. Joyson trades at 19x P/E 2020E, vs. its 5-year range of 12-39x. Fuyao trades at 12x P/E 2020E, vs. its 5-year historical range of 10-24x.

Some investors believe Huayu is significantly undervalued compared to its peers, considering its unique market position. However, we believe valuation upside of Huayu's is limit due to its huge sales base which is not sensitive to any big earnings increase from any single products. In addition, its corporate structure (having 18 JVs and associates with foreign partners out of its major 28 business contributors) limit its client base expansion due to JV partners' restriction on non-compete within same products segments. Huayu trades at 8x P/E 2020E based on Bloomberg consensus, vs. its 5-year historical range of 6-14x P/E and 5-year average of 9.7x. We believe its current valuation is reasonable.

Based on Bloomberg consensus, Wanfeng trades at 15x P/E 2020E, which is at sector average level. However, its expected earnings growths are weaker than peers' average. And we have concern on Wanfeng's business growth in the next 5 years. It might take long time to see PV wheel consolidation which might be the only driver of its aluminium alloy wheel business. While its Magnesium alloy part business is not big enough to drive earnings growth yet. Entering aircraft business strengthen our concern.

Wanxiang Qianchao is not a stock that is widely covered by analysts in the market. We estimate its net profit CAGR would be 50% during 2020-2021E once its new capacity ramps up. But current valuation,18.7x P/E 2020E and 11.3x P/E 2021E, is not attractive enough.

Based on Bloomberg consensus, Linglong trades at 12.3x P/E 2020E, which is quite attractive, vs. its historical P/E range of 13-30x P/E (average of 18.5x) and expected earnings growth in the next few years. Also, when Linglong's sales exposure to PV goes above 75%, a valuation rerating would probably be triggered

Weifu trades at 7.9x P/E 2020E, which is fair, vs. its historical P/E range of 6-26x P/E and expected earnings growth in the next few years, and long term concern on its core business.

Company name	Ticker	Last price(Rmb)		Bloomberg EPS(Rmb)			EPS growths		P/E(X)		
			2018	**2019E**	**2020E**	**2021E**	**2020E**	**2021E**	**2019E**	**2020E**	**2021E**
CHANGZHOU XINGYU AUTOMOTIVE	601799 CH	79.65	2.21	2.74	3.45	4.29	26%	24%	29.0	23.1	18.6
NINGBO JOYSON ELECTRONIC	600699 CH	19.2	1.02	0.84	1.02	1.30	21%	28%	23.0	18.9	14.8
FUYAO GLASS GROUP A	600660 CH	17.93	1.64	1.27	1.44	1.63	14%	13%	14.2	12.4	11.0
HUAYU AUTO SYSTEM	600741 CH	18.91	2.55	2.14	2.33	2.56	9%	10%	8.8	8.1	7.4
WANFENG AUTO WHEELS	002085 CH	6.68	0.44	0.38	0.45	0.48	18%	7%	17.6	14.8	13.9
WANXIANG QIANCHAO*	000559 CH	4.93	0.26	0.19	0.26	0.44	40%	65%	26.1	18.7	11.3
SHANDONG LINGLONG TYRE	601966 CH	18.82	0.98	1.33	1.53	1.81	16%	18%	14.2	12.3	10.4
WEIFU HIGH-TECH	000581 CH	17.95	2.37	2.18	2.28	2.50	5%	10%	8.3	7.9	7.2
Sector average							**19%**	**22%**	**17.6**	**14.5**	**11.9**
*Sources: Bloomberg, *Victoria Li estimates*											

Key Risks

On a sector wide base, the key risks include 1) weaker than expected NEV sales, especially right after government subsidies quit in 2021E; 2) slower than expected technology development on autonomous driving functions; 3)slower than expected car users' acceptance on autonomous driving functions, which has low possibility to happen; 4) unexpected challenges on overseas expansions, which might hurt companies' earnings in short term; 5) unexpected technology advantage loss after taking over JVs' rights.; 6) OEMs switching back to imported components due to quality issue, which has low possibility.

Key downside risks on buying our preferred stocks includes company strategy change; lower than expected marketing capability; higher than expected raw material cost goes; unexpected product quality failure; capacity expansion delay, etc. Key upside risks on unfavored stocks are: newly acquired non-core business grows faster than expected; new unexpected successful M&A; etc.

Conclusion

We prefer Passenger vehicle(PV) part suppliers over commercial vehicle (CV)part suppliers.

Among PV parts suppliers, our top buy is **Changzhou Xingyu (601799.CH)**, followed by **Ningbo Joyson Electronic(600699.CH),Fuyao Glass (600660.CH/3606.HK**) and **Huayu Auto (600741.CH)**. Our main underweight **Wanfeng Auto Wheel (002085.CH)**.

In Commercial vehicle (CV) part segment, we prefer **Wanxiang Qianchao (002085.CH)** and **Linglong Tyre (601966.CH)**. We suggest investors to avoid **Weifu High-Tech (000581.CH).**

Detailed Discussion of the Companies

Changzhou Xingyu (601799.CH)

Background: Controlled by Zhou's family, Xingyu is pure auto lights supplier in China with 7.1% market share 2018. It is the only local brand among Top 6 suppliers. Xingyu's products include headlights, tail lights, signal lights, fog lights, and others. In 2019, its new product,LED ADB (Adaptive Driving Beam), started mass production with first order from FAW. Moreover pixel headlight(equivalent to Mercedes's digital light) is available for ordering. Xingyu has majority of its sales from the China market. In 2018, Xingyu has only 2.7% revenue from overseas.

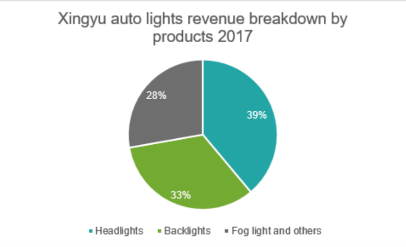
Smart auto lights penetration increase would drive Xingyu's gross profit growth with a CAGR of at least 32% .

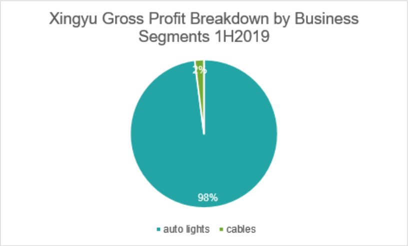
Since 2019, Xingyu started mass production of LED headlights with first order from FAW. This means the company's headlights' ASP would increase from currently estimated Rmb1,000 per car to Rmb11,000 per car or above in the next 5-10 years. **We estimate its gross profit to grow with a CAGR of at least 32% during 2018-2025E, assuming Xingyu's market share unchanged in auto lights market.**

LED headlights penetration rise would drive Xingyu's autolight gross profit grow with a CAGR of 32%

Auto lights segment	**2017**	**2018**	**2025E***	**CAGR**
Sales (Rmb mn)	3,752	4,505	24,577	27%
Numbers(mn units)	57	65	67	0%
ASP(Rmb/unit)	66	70	369	27%
Gross margin	23%	24%	30%	3%
Gross profit (Rmb mn)	858	1,064	7,373	32%

*Sources: company data, Victoria Li estimates * assuming revenue and sales number increase is only from headlight upgrading to LED*





Sources: company data

Auto headlights prices comparison

	Halogen	**Xenon**	**LED**				
			Ordinary	**Adaptive LED (BMW)**	**Multibeam LED (Mercedes)**	**Matrix headlight (Audi)**	**Pixel headlights(WEY VV6)**
(Rmb/car)	400-500	800-1000	1600-2000	7,500	11,000	14,500	35,000
Sources:autohome							

Auto light sources are being upgraded all the time since the invention of automobiles. 1)**Now LED light penetration is rising from previously used halogen and xenon lights**. Key advantages of LED lights, compared to the others, are: longevity, concentration of lights, energy saving, fast response and wide light temperature range. It also makes 'intelligent-ization' of auto lights possible. In 2019, China's LED auto headlight penetration is estimated to be 40-45%, and is estimated to reach 60% by 2021E. The price gap between LED headlight and halogen/xenon lights are between Rmb600-1,600 per car. Increasing penetration of LED lights would benefit all the LED auto lights suppliers.

Comparison of three types of auto lights in market

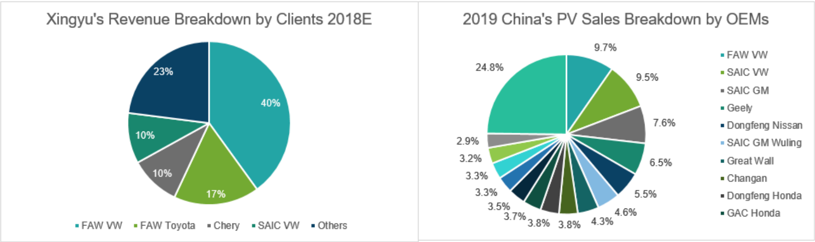
	55W Halogen	**35W Xenon**	**40W LED**
Brightness (lumens)	1,000	3,200	6,200
Service life (hours)	500	30,000	100,000
Lighting performance	Divergent	Concentrated, but brightness reduced at edge areas	Concentrated
Energy consumption	55W	35W	40W
Response	Slow	relatively slow	fast
Light temperature	3000K	4200-6000K	3000-7000K
Sources: auto home			

2)Another key upgrade in auto light sector is intelligent light system for safety and rising levels of autonomous driving, which shall further increase products' prices and margins. Currently, the most used are ADB (Adaptive Driving Beam) and AFS (Adaptive Front-light System).Adaptive Driving Beam (ADB) is a headlamp system that ensures wide visibility for drivers by enabling to drive with high-beams all the time while avoiding glaring to oncoming vehicles or vehicles ahead. The Adaptive Front-lighting System (AFS) optimizes distribution of light from the headlights according to driving circumstances. Depending on vehicle speed and steering input, the system points the low-beams headlights in the direction the driver intends to travel. AFS is already commonly used for car models priced at Rmb150,000 and above. while ADB is under evolution. ADB penetration in China is estimated to be around 2%.

Initially ADB is achieved by dynamic lighting system, such as BMW's **Dynamic Xenon and Adaptive LED**, which was first introduced in China in 2006. In 2011, Audi introduced **Matrix LED headlights**, which produce the high beam with tiny light-emitting diodes that are bundled in common reflectors or lenses. In 2014, Mercedes introduced M**ultibeam LED headlights**, which enable high beam to be left on without dazzling other road users. 84 individually controllable LEDs direct the light precisely so as to blank out other vehicles whilst illuminating the surroundings with almost daytime-level brightness. A total of four control units calculate the ideal light pattern 100 times per second using information from a camera behind the windscreen. Now the latest intelligent light system features chips work with over one million micromirrors, such as **Audi's Digital matrix LED headlights and Mercedes's Digital Light.**

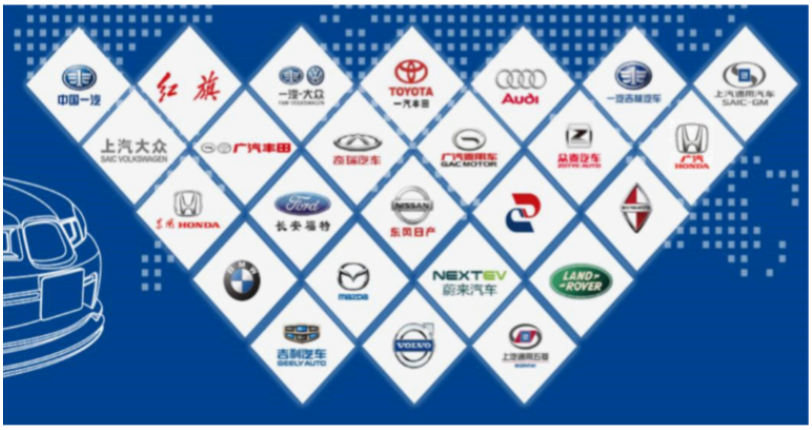
Client base expansion/penetration increase might double Xingyu's revenue further.

Currently Xingyu has about 40% revenue from FAW VW, followed by FAW Toyota, Chery and SAIC VW. Top 4 clients, whose total market share in China was 25.6% in 2019, contribute nearly 77% of Xingyu's revenue. Moreover Xingyu's penetration in its existing clients is below 50%, except FAW VW. In recent years, Xingyu is gaining orders from new clients, including Japanese brands (21.3% total market share in China) and luxury brands (such as BMW global and Beijing Mercedes Benz). **If Xingyu gets 50% of Japanese brands' lights demand, its revenue would increase by additional 150%.**



Sources: company data, CAAM, Victoria Li esimates

Xingyu's existing customers


中国一汽
红旗
一汽-大众
TOYOTA
一汽丰田
Audi
上汽通用汽车
SAIC-GM
上汽大众
SAIC VOLKSWAGEN
广汽丰田
奇瑞汽车
GAC MOTOR
广汽
HONDA
东风 HONDA
Ford
长安福特
NISSAN
东风日产
mazda
NEXTEV
蔚来汽车
LAND-ROVER
吉利汽车
GEELY AUTO
VOLVO

Sources: company data

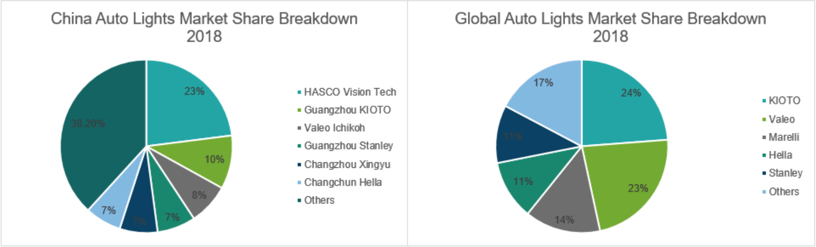
Overseas capacity expansion to explore overseas demand.

In 2018, Xingyu had only 2.5% revenue from overseas. In 2019, Xingyu announced to build auto light factory by Jan 2023 in Serbia with capacity of 5.7mn units.The new plants would cover demand from GM, Chrysler, VW, Mercedes Benz, BMW and Peugeot. **Xingyu estimated that the new plant would contribute Euro14.83m(or Rmb117mn) of pre-tax profit, equivalent to 13% of Bloomberg consensus pre-tax profit 2019E.**

Xingyu's Auto Lights products
Sources: company data

China's major auto light suppliers' market shares are stable but industry consolidation is still possible with product specification upgrade trend.

In 2018, Xingyu was the only local company among Top 6 suppliers, and ranked No.5 by market share in China. All the others have background with global leaders (HASCO Vision Tech used to be a JV between Huayu and KIOTO and became 100% owned subsidiary of Huayu). In the past few years, market shares of Top 6 has been quite stable. However, **with the technology upgrade for smart auto lights, smaller suppliers might lose their market shares to Top 6, including Xingyu.**



Sources: company data, Gasgoo

Valuation

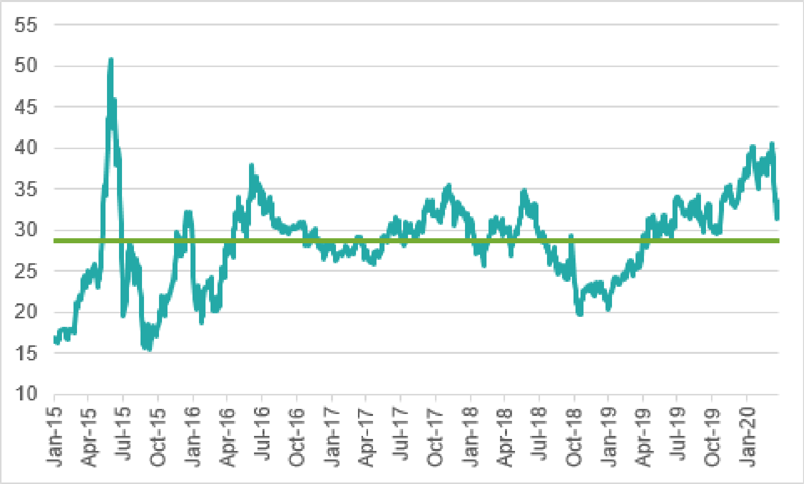
In A-share market, P/E ratio is still considered as the most valuation methodology.Xingyu's valuation might look a little bit aggressive compared to peers. However, 1) we believe the market significantly underestimated Xingyu's earnings growths in the next few years. We estimate Xingyu's net profit CAGR would be 40% during 2020-2021E (without impact from Coronavirus, which is difficult to quantify at current moment), which indicates 20.8x P/E on 2020E and 14.8x P/E on 2021E. 2) Xingyu's 5-year historical P/E range is at 15-52x with average of 28.8x, which indicate its current valuation is at low range. We suggest BUY on Xingyu due to its expected fast earnings growth driven by smart auto light penetration rise, consensus upgrading possibility and relative attractive valuation.

Xingyu's Consensus Forecast

(Rmb mn)	**2018**	**2019E**	**2020E**	**2021E**
Revenue	5,074	5,881	7,062	8,586
Operating profit	622	883	1,114	1,392
Net Income Adj+	611	760	953	1,187
Net margin (%)	12.0%	12.9%	13.5%	13.8%
Net income growth		24%	25%	25%
EPS Adj+	2.21	2.74	3.45	4.29
P/E	36.02	29.05	23.09	18.57

Sources: Bloomberg Last price on 23 March 2020

Xingyu's Historical P/E (average: 28.8x)



Sources: Bloomberg

Ningbo Joyson Electronic(600699.CH)

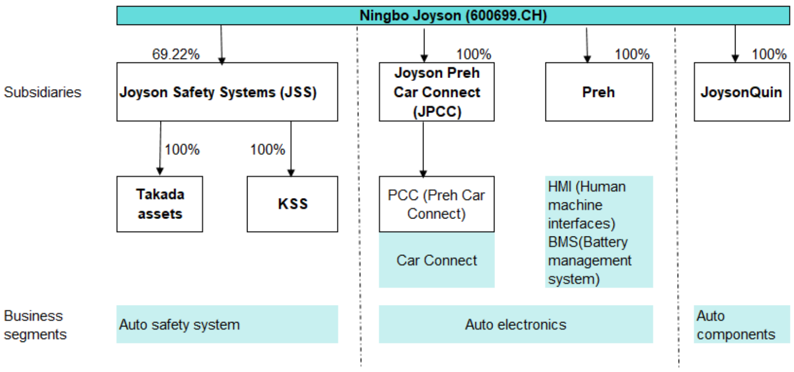
Background: Controlled by Mr. Wang Jianfeng, Joyson is second largest auto safety system supplier in the world with 30% global market share, grew rapidly through M&A. Key acquisitions include Preh GmbH (auto electronic,2011), Quin GmbH(steering wheels etc, 2014), IMA(industrial robot, 2014), TS-Daun (modular information system,2016), Key Safety Systems (KSS, auto safety system,2016), Takata (auto airbag,2018). Major

clients are OEMs in Europe and America, with 78% revenue from overseas in 1H2019. Smart cabin system provider ready for L3 level autonomous driving commercialisation.

Consolidation on KSS and Takada to improve profitabilities and gain market share.

In 2018, the company established Joyson Safety Systems (JSS) to integrate and restructure the recent acquired auto safety system assets - mainly by reducing redundant capacity and consolidating supply chain management, marketing and client management. The integration process is expected to complete by 2021, which would improve JSS's gross margin and net margin from 16.7% and 3.8% respectively in 1H2019 to 20% and 5% in 2021E. **Margin improvement would increase Joyson's net profit by 30%. In addition, passive auto safety system sales would be driven by increasing safety consciousness in developing countries. IHS estimates global active safety market size would double by 2025 from 2017.**

Joyson Business Structure


Ningbo Joyson (600699.CH)
Subsidiaries
69.22%
Joyson Safety Systems (JSS)
100%
100%
Takada assets
KSS
100%
Joyson Preh Car Connect (JPCC)
PCC (Preh Car Connect)
Car Connect
100%
Preh
HMI (Human machine interfaces)
BMS(Battery management system)
100%
JoysonQuin
Business segments
Auto safety system
Auto electronics
Auto components

Sources: company data

Joyson's products

Active safety
Passive safety
Car connect
HMI
BMS
Auto components

Sources: company data

Well positioned in L3 level autonomous driving tech would translate into earnings surge.

Joyson's auto electronic segment provides HMI, car connect and e-mobility, which have high penetration in VW, Mercedes and BMW in Europe. Well known car-connect products include BMW's i-drive and Audi's MMI. Lately, Joyson is combining active auto safety system with V2X for commercialisation of L3/L4 level autonomous driving, and launched smart cabin integration.

1) Its new steering system offers adaptive steering, driver management system, etc for achieving L3 level automation.

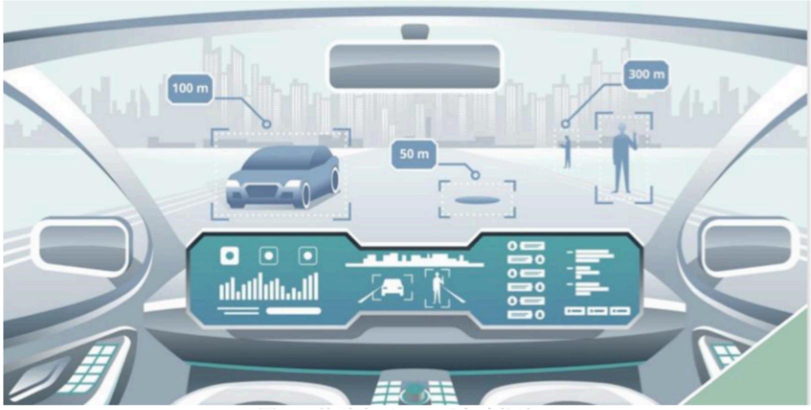
2) It's first generation 5G-V2X product will start mass production in 2021.

3) In Europe, latest IVI(In-vehicle infotainment) system based on Android auto co-developed with Audi and VW starts mass production in 2020 with order value of Rmb10b. IVI system for Benz MFA2 is started with order value of Rmb9b. During 9M2019, new orders on electronics above Rmb20b, vs.estimated Rmb10b sales in 2019E.

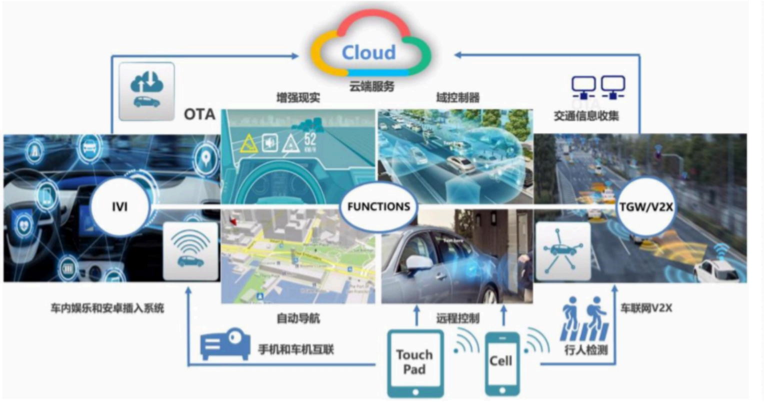
4) R&D with global OEMs on L4 functions such as remote control driving, interaction among vehicles, pedestrians and facilities is in process.

5) Moreover, Joyson's BMS (battery management system for NEV) client base is expanding from existing Benz, BMW and geely, to Nissan, Ford, SAIC GM, VW supply chain. Joyson has Rmb13.1b order on e-mobility at end June 2019.

We estimate Joyson's auto electronic sales to grow with a CAGR of 50% during 2019-2025E.


100 m
300 m
50 m

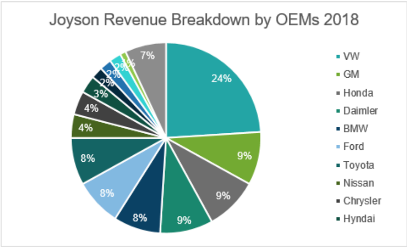
Joyson Launched first V2X Platform in the world
Sources: company data

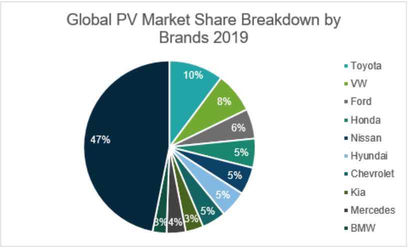

Cloud
云端服务
OTA
增强现实
域控制器
交通信息收集
IVI
FUNCTIONS
TGW/V2X
52
车内娱乐和安卓插入系统
自动导航
远程控制
车联网V2X
手机和车机互联
Touch Pad
Cell
行人检测

Joyson's Smart Cabin Integrated Solution
sources: company data

Leveraging the key overseas acquisitions to increase penetration in the China market and gaining market share quickly.

As all the key assets previously based outside of China, Joyson's major clients are OEMs in Europe and America, with 78% revenue from overseas in 1H2019. Benefiting from solid client relationship with global OEMs, Joyson's orders from Chinese OEMs (JV brands) surges since 2018. In China, IVI system for MQB and MEB platforms of FAW VW and SAIC VW started mass production in 2H2019 with estimated order value of Rmb19bn. Lately, it entered Tesla's shanghai's supply chain for auto safety products with estimated order value of Rmb1.5bn (Joyson is Tesla US's supplier with existing orders from Tesla is Rmb7.5bn (6bn auto safety, 1.5bn auto electronics)).





Sources: company data, CNBC

Valuation

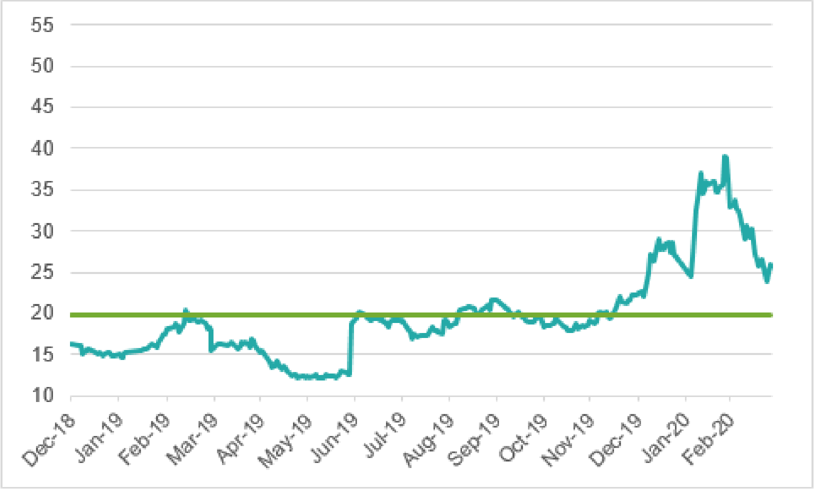
Since the acquisition of Takata assets, Joyson's traded between 12-39x P/E. Based on Bloomberg consensus, Joyson trades at 19x P/E 2020E, which is quite attractive compared with its expected earnings growth in the next two years and its own historical P/E range.

Joyson's Consensus Forecast

(Rmb mn)	**2018**	**2019E**	**2020E**	**2021E**
Revenue	56,181	62,011	62,621	68,648
Operating profit	1,873	2,633	3,093	3,748
Net Income Adj+	1,318	1,045	1,183	1,539
Net margin (%)	2.3%	1.7%	1.9%	2.2%
Net income growth		-21%	13%	30%
EPS Adj+	1.02	0.84	1.02	1.30
P/E	18.81	22.97	18.92	14.77

Sources: Bloomberg Last price on 23 March 2020

Joyson's Historical P/E (average: 19.8x)



Sources: Bloomberg

Fuyao Glass (600660.CH/3606.HK)

Background: Fuyao is a family controlled company controlled by Mr. Cao Dewang. Fuyao got technology initially from Saint-gobain by founding JV in 1996, then Fuyao's parent company acquired its partner's shares and quit the co-operation in 1999. Now Fuyao is the second largest auto glass supplier in the world with 22% market share in 2017, and China's largest auto glass supplier with 63% market share. In 2018, Fuyao has 41.8% revenue from overseas. In January 2019, Fuyao acquired SAM, Germany based bankrupt leading aluminium auto trim parts supplier and started auto trim parts business.

Latest new function glasses for smart car would raise Fuyao's ASP by 20%.

HUD (head up display) glass would get popular in the next 5 years due to better driving safety and experience in our view. **Antenna glass** could receive GPS and other signals for autonomous driving. **Lightweight glass** could further reduce the overall weight of car, which is particularly important to NEV models. **Dimming glass** provides easy switching between transparency and privacy. It can also be used as screen for in-vehicle entertainment system. All above would add value on Fuyao's glass products and raise its ASP and margin. **Panoramic Sunroof** penetration would go up further from current 40% to 70% in 2025E, which could increase Fuyao's sunroof glass sales by 60%. **We estimate Fuyao's auto glass ASP might**

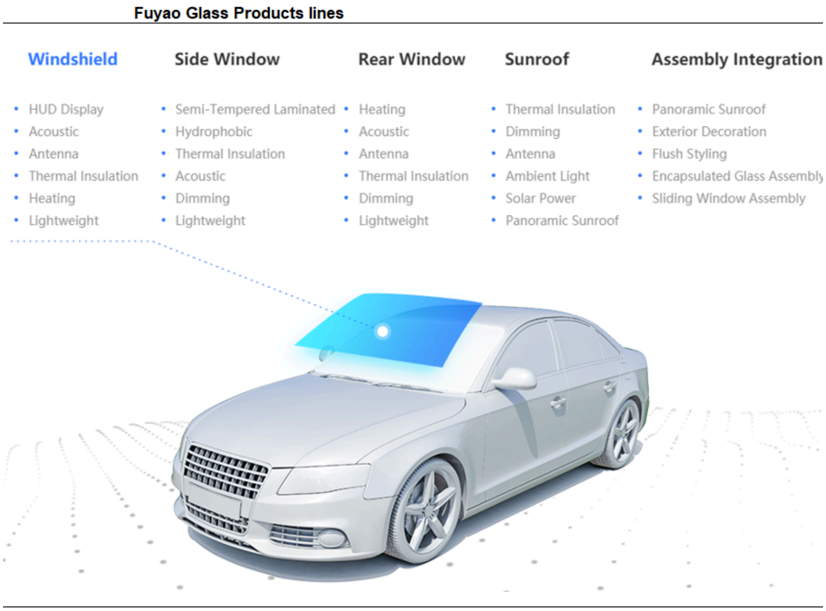
increase from Rmb164/m2 in 2018 to Rmb195/m2 in 2025E, which would translate into 19% sales increase with higher margins, assuming no sales volume increase. (Click here for Fuyao products)

Sunroof glass and high-end glass have higher ASPs

Auto glass types	**Average price (Rmb/sqm)**
Sunroof glass	2253
For luxury brands	2585
For JV/local brands	2101
Front windshield glass	1155
For luxury brands	1374
For JV/local brands	1000

Sources: Wangqi Auto glass, Victoria Li estimates

The glass used in high-end cars has more new functions


Fuyao Glass Products lines
Windshield
Side Window
Rear Window
Sunroof
Assembly Integration
HUD Display
Acoustic
Antenna
Thermal Insulation
Heating
Lightweight
Semi-Tempered Laminated
Hydrophobic
Thermal Insulation
Acoustic
Dimming
Lightweight
Heating
Acoustic
Antenna
Thermal Insulation
Dimming
Lightweight
Thermal Insulation
Dimming
Antenna
Ambient Light
Solar Power
Panoramic Sunroof
Panoramic Sunroof
Exterior Decoration
Flush Styling
Encapsulated Glass Assembly
Sliding Window Assembly

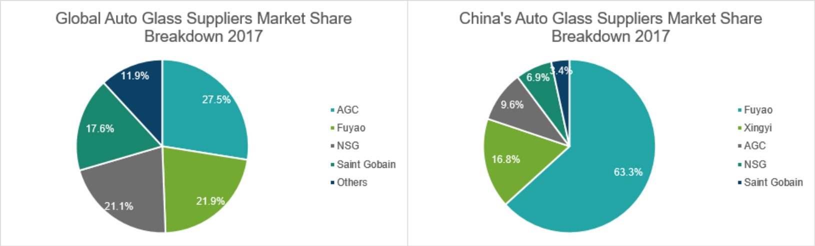
Sources: company data

Overseas plant utilisation rate improvement to raise profitability.

Fuyao started US plant construction in 2014. Its plant in Ohio came on stream in 2016 and contributed positive earnings in 2017. In 1H2019, Fuyao's US plants contributed 18.6% of Fuyao's total sales. In 2020, Fuyao estimates its US plants to sell 4.6-4.7mn sets of auto glass with full capacity. Its profitability would reach the same level of domestic plants. It also has a Russian plant which would sell 1mn sets of auto glass, and its margin would go up further.

Entering Tesla Shanghai supply chain.

In 2020, Fuyao starts supplying side window glass to Tesla Shanghai. This order might bring max Rmb70mn revenue in 2020E, which is not big compared to Fuyao's annual sales. However, Fuyao might get chance to win Tesla's orders on windshield glass, rear window glass or sunroof glass, which have much higher ASP and margins.



Sources: company data

Expanding into aluminum trim parts business.

Fuyao entered aluminium auto trim parts business in 2019 by acquiring SAM, Germany aluminium auto trim parts supplier. It also acquired domestic metal moulding company and aluminium smelting company as suppliers to SAM, to maximize its aluminium trim parts' profitability. In the short term, these moves would lower Fuyao's margins since 2019 until SAM's margin recovers. But in the long term, auto trim parts business could bring additional earnings. As a major supplier to VW in Europe, we estimate SAM would gain orders from VW China as an entry point of exploring China market.

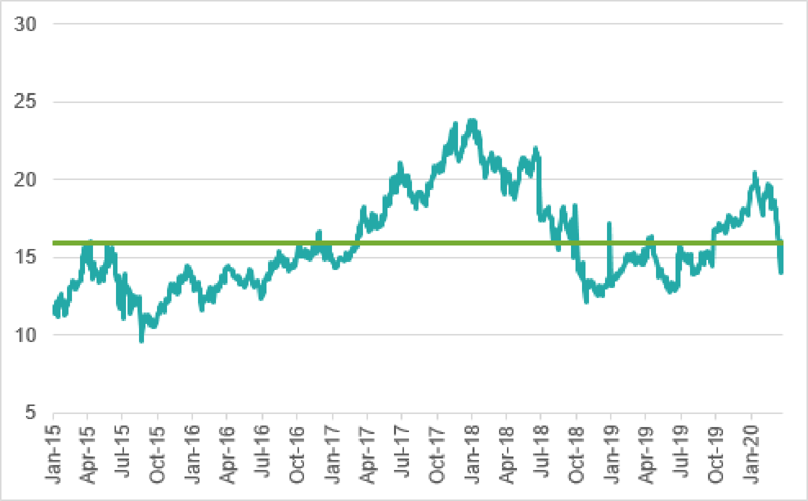
Valuation

In the past 5 years, Fuyao was traded between 10-24x P/E. Based on Bloomberg consensus, Fuyao trades at 12x P/E 2020E, which is attractive compared to its historical average of 16x. Fuyao's earnings growth is about to speed up in the next few years, while its valuation is still at low range.

Fuyao's Consensus Forecast

(Rmb mn)	**2018**	**2019E**	**2020E**	**2021E**
Revenue	20,225	21,346	22,919	24,868
Operating profit	4,159	3,711	4,182	4,800
Net Income Adj+	4,120	3,164	3,539	4,065
Net margin (%)	20.4%	14.8%	15.4%	16.3%
Net income growth		-23%	12%	15%

EPS Adj+	1.64	1.27	1.44	1.63
P/E	10.93	14.15	12.43	10.99
Sources: Bloomberg Last price on 23 March 2020				

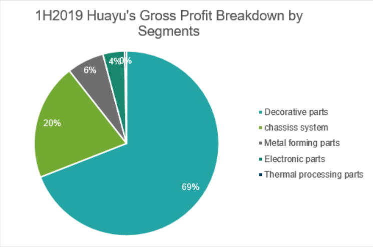


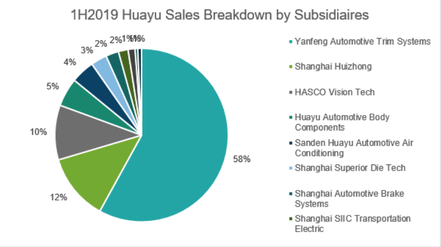
Fuyao's Historical P/E (average: 16x)

Sources: Bloomberg

Huayu Auto (600741.CH)

Background: Owned by SAIC (600104.CH,SOE), Huayu is an auto parts conglomerate. It's the largest auto parts supplier in China with most comprehensive products and biggest client base. It has five business segments with dozens of subsidiaries and JVs. Decorative parts segment mainly produces auto seats, auto lights, passive auto safety system, interior covering for panels, etc; and exterior parts such as bumper module, fender module, adaptive cruise control panel, etc. Chassis system segment mainly provides chassis integration, suspension system, steering system, braking system and transmission system.Metal forming parts segment produces aluminium alloy car body parts. Auto electronic segment mainly provides E-drive system(integrated inverter, asynchronous/synchronous motor and gearbox) , thermal management system and BMS(Battery Management System). Thermal processing parts segment offers crankshaft,knuckle, exhaust pipes, etc. Lately, Huayu built up new segment for car intelligence and connectivity. In 1H2019, it has 24% revenue from overseas, which is mostly contributed by Yanfeng Automotive Trim System who consolidated Johnson Controls's auto trim assets. In 2019, Huayu gained orders from Tesla Shanghai for car seats, car body parts and battery cases.

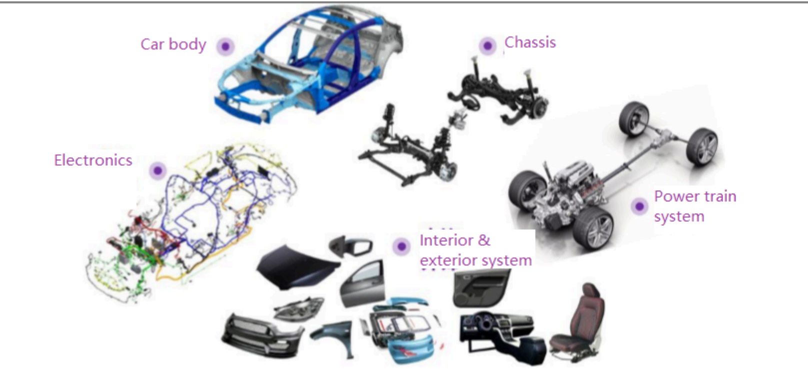




Sources: company data

Smart cabin seats would be the new driver to raise ASP and margin.

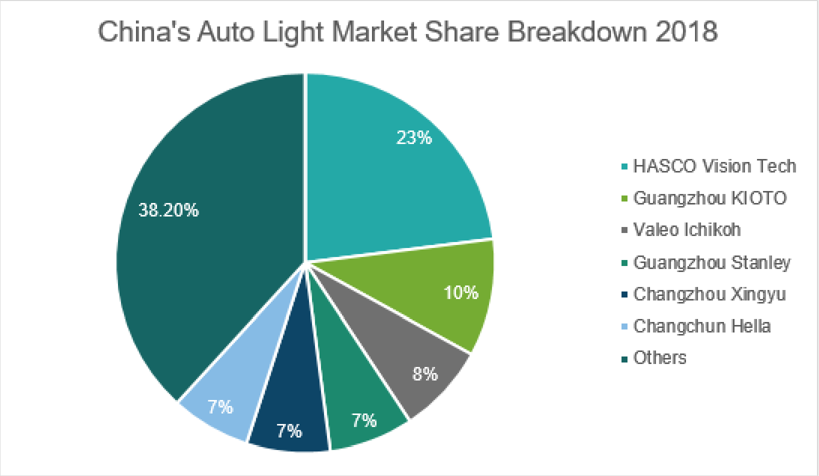
Yanfeng Automotive Trim Systems is the biggest revenue contributor of Huayu. Car seat, produced by a JV with Adient, is one of this subsidiary's key products with 30% market share in China. As an important part to provide comfortable driving experience, car seat is being upgraded all the time. Recent high end car seat can offer heating, massaging, multi-direction adjustment, head neck production system, integrated child seat, etc. Upgrading demand is the key earnings driver of car seat business. **Entry level car seat is priced at Rmb2000/car, while high-end car seat could cost at least Rmb10,000/car.** Lately, smart cabin becomes a new trend in car seat segment. By adding functions such as Driver Monitoring System, loT remote control system for L3 or higher level car autonomous driving, smart cabin seats price would hit a new high.



Typical passenger vehicle structure   Sources: gasgoo

Benefiting from smart auto lights penetration increase.

Through its subsidiary, HASCO Vision Tech, Huayu is the largest auto lights supplier in China with 23% market share in 2018. In 1H2019, HASCO Vision Tech was third largest subsidiary contributing 10% of Huayu's revenue. Previously known as Shanghai KIOTO, HASCO Vision Tech was a JV of Huayu and KIOTO, In March 2018, Huayu acquired its JV partner's 50% stake and turned it into 100% owned subsidiary. Benefiting from auto lights upgrade, HASCO Vision Tech's ASP increased to Rmb200/car from Rmb139/car in 2011. In 2019, HASCO Vision Tech co-developed programmable interactive headlight with Human Horizons, which is equivalent to Mercedes Benz's digital light tech announced in 2018. Functions it could achieve include ADB(Adaptive Driving Beam), AFS(Adaptive Front-lighting System).



Sources: company data, Gasgoo

Auto headlights prices comparison							
	Halogen	**Xenon**	**LED**				
			Ordinary	**Adaptive LED (BMW)**	**Multibeam LED (Mercedes)**	**Matrix headlight (Audi)**	**Pixel headlights(WEY VV6)**
(Rmb/car)	400-500	800-1000	1600-2000	7,500	13,500	14,500	35,000
Sources: autohome							

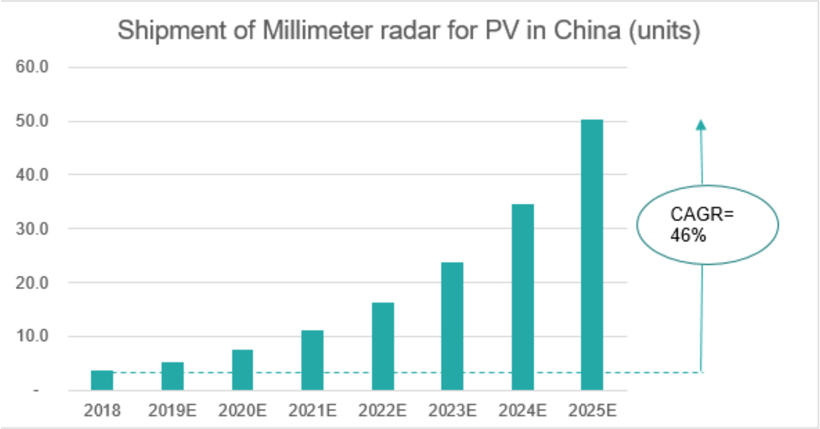
INTELLIGENT DRIVING TRACK MARKUPS
智能车道标注

Huayu's programmable interactive headlight Sources: Company data

Early starter of supplying millimeter radars.

Millimeter radar is necessary for autonomous driving cars to detect surrounding information, such as speed, distance, etc. The higher level autonomous driving technology is used, the more radars per car is needed. According to Shujubang, shipment of millimeter radar for passenger vehicle was 3.58mn units, up 54% yoy. Assuming 30% new cars have L3 functions (with 4 radars per car) and 60% new cars have L2 functions in 2025E(with 1 radar per car), annual shipment of millimeter radar would be 50.4mn units, indicating a 46% CAGR.

Huayu started R&D on millimeter radar in 2014, and provides stable supply of 24Hz millimeter radar to SAIC PV since 2018. 77/79Hz millimeter radar is under development. **Assuming Huayu gets 20% market share, which means Huayu supply all the radars SAIC needs, its annual millimeter radar sales would be Rmb5bn in 2025E, equivalent to 3% of Huayu's 2018 revenue.**

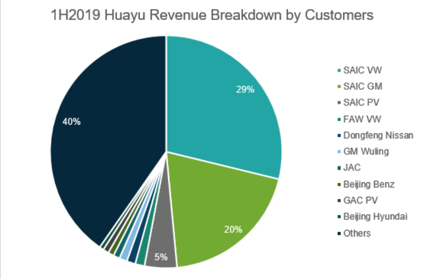


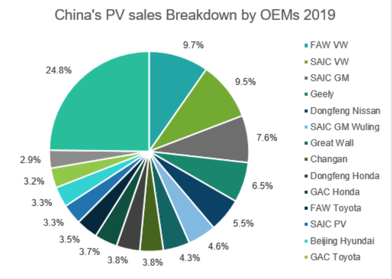
Sources: Shujubang, Victoria Li estimates

NEV powertrain system is expanding quickly with key technology from Magna. Huayu diandong is the main body of Huayu's NEV related business, which has capacity of 260,000 driving motors and 60000 controllers. It is estimated that Huayu Diandong would sell 500,000 motors in 2023 with its market share rising to 14% from 4.8% in 2018. In 2017, Huayu founded a JV with Magna, HASCO Magna, to produce integrated eDrive powertrain system initially for MEB cars of SAIC VW and FAW VW. In 2019, it gained orders for GM's BEV3 platform cars. HASCO Magna would start contributing earnings from 2021 onwards.

Customer concentration risk due to non-compete with JV partners.

Although Huayu is working hard on expanding its client base, SAIC remains the biggest client with 54% of revenue in 1H2019 (vs. 68% in 2006). We believe the reasons behind are: 1) Large sales base which is less sensitive to additional orders from single new customer on single product. 2) JV partners' restriction on non-compete within same products segments. Among its major 28 business contributors, 18 of them are JVs and associates with foreign partners. Taking over the stakes from JV partners might release the restriction in the long term, like what Huayu did to gain full control on its auto light business,HASCO Vision Tech. However that would also make the company lose some technology advantage.





Sources: company data, CAAM

Valuation

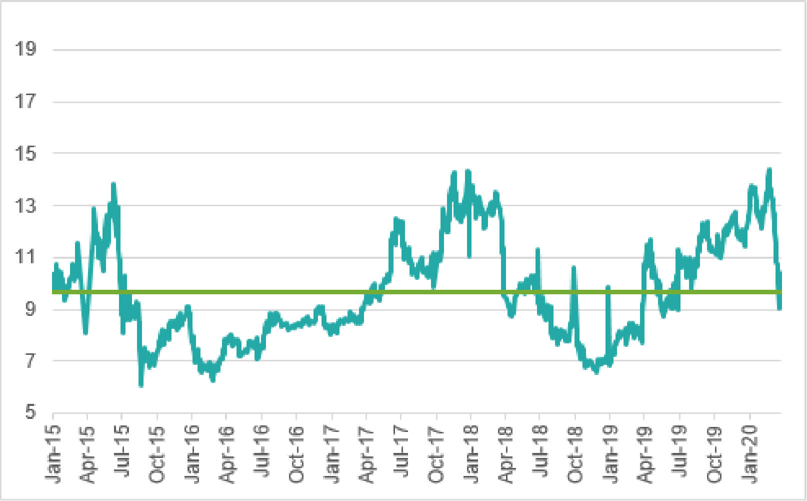
Huayu trades at 8x P/E 2020E based on Bloomberg consensus, vs. its 5-year historical range of 6-14x P/E and 5-year average of 9.7x. We believe its current valuation is reasonable. Some investors believe Huayu is significantly undervalued compared to its peers, considering its unique market position. However, valuation upside of Huayu's is limit due to its huge sales base which is not sensitive to any big earnings increase from any single products. In addition, its corporate structure (having 18 JVs and associates with foreign partners out of its major 28 business contributors) limit its client base expansion due to JV partners' restriction on non-compete within same products segments.

Huayu's Consensus Forecast

(Rmb mn)	**2018**	**2019E**	**2020E**	**2021E**
Revenue	157,170	146,207	154,341	166,640
Operating profit	5,786	9,063	9,119	10,192
Net Income Adj+	8,027	6,730	7,262	8,001
Net margin (%)	5.1%	4.6%	4.7%	4.8%
Net income growth		-16%	8%	10%
EPS Adj+	2.55	2.14	2.33	2.56
P/E	7.43	8.82	8.13	7.38

Sources: Bloomberg Last price on 23 March 2020

Huayu's Historical P/E (average: 9.7x)



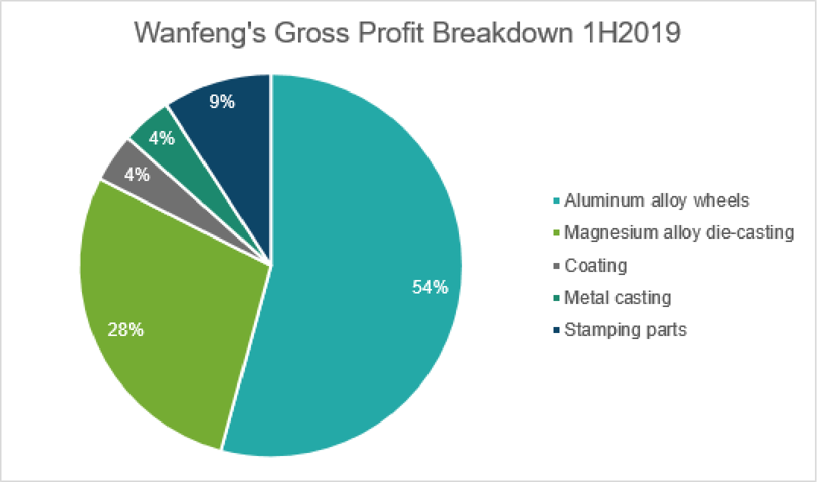
Sources: Bloomberg

Wanfeng Auto Wheel (002085.CH)

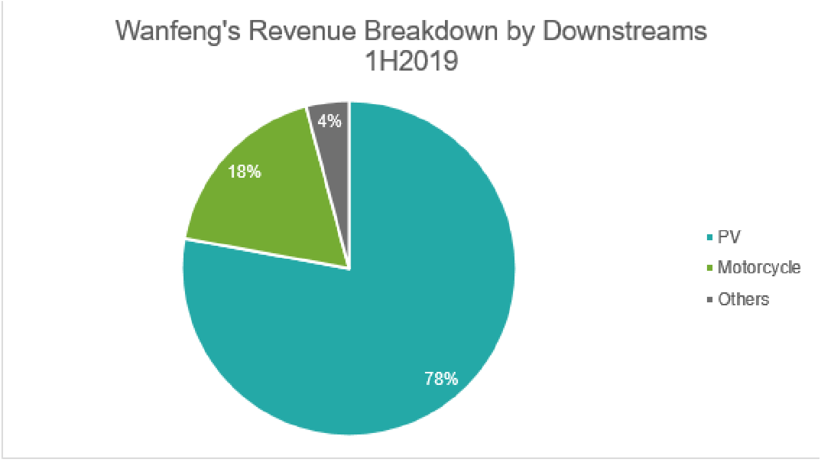
Background: Top 3 aluminium auo wheel suppliers in China, controlled by Chen & Wu family. It's also the largest motorcycle wheel supplier in the world. In 2015, Wanfeng Auto acquired Wanfeng Meridian and started magnesium alloy components business. In 1H2019, it had 55% revenue from overseas. It had 78% revenue from passenger vehicles sector, 18% from motorcycle sector and 4% from high speed rail and plane sectors.

Market share gain potential with client base extension.

In China, majority PV wheels are aluminium alloy wheels, which lead to limit upside on market size increase. However, PV wheel market is quite diversified. Total market share of Top 3 is only 30%. Recent auto market weakness, including outbreak of Coronavirus, might trigger industry consolidation and benefit Wanfeng. On the other hand, Wanfeng's major clients are European and American OEMs. It's supplier of Mercedes, BMW, VW, Ford, GM, Fiat, Toyota and PSA. It provides 80% of PSA China's auto wheels. It's exclusive supplier of Land Rover China. Recently, Wanfeng is gaining orders from Japanese brands, which might help it gain market share.



Sources: company data



Sources: company data

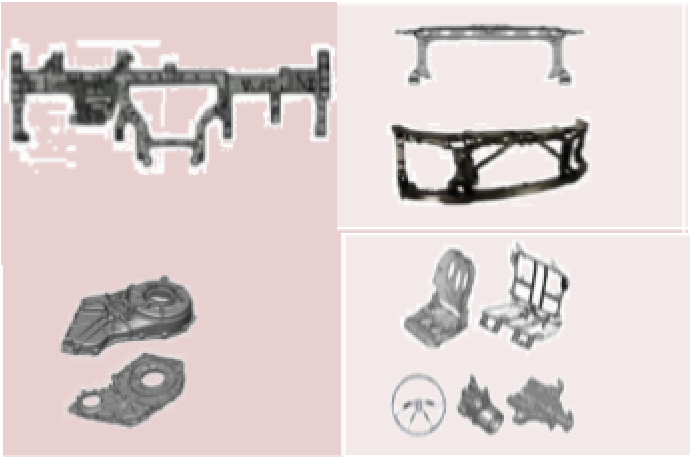
Wanfeng's Auto Wheels (part)

规格型号：63202080
规格型号：12512080
规格型号：59661665
规格型号：63281770

Sources: company data

Magnesium alloy parts might be the earnings driver in the long term.

Wanfeng Meridian, the subsidiary producing magnesium alloy parts, had 65% market share of North American magnesium alloy die-casting parts. Its major customers are Ford, GM and Tesla. In 2017, it set up branch in China and explore domestic market. In North America, magnesium alloy per car is 5.8kg-26.3kg, vs. China's 3kg per car in 2017. Assuming China's magnesium alloy per car reaches 20kg in 2025, total magnesium alloy parts demand would increase by a CAGR of 29% during 2017-2025E. **If Wanfeng gains 20% market share in China, its annual sales from magnesium alloy parts would be Rmb2.24b, or 20% of Wanfeng's revenue in 2018.**



Wanfeng's Magnesium Alloy Parts Sources: company data

Entering aircraft business.

In Jan 2020, Wanfeng announced to acquire 55% stake of Wanfeng Aeroplane from parent company. Wanfeng Aeroplane is a general aeroplane manufacturer. It's world third largest fixed-wing aircraft manufacturer after acquiring well known aerocraft companies in Austria and Canada. This business might be a new earnings driver of Wanfeng in the future, considering China's encouraging private aircraft use in low-altitude airspace. However, it also indicates Wanfeng management might have seen limit upside on its alloy parts business, and want to explore another area which management had no experience before.

Wanfeng's new aircraft

Sources: carnoc.com

Valuation:

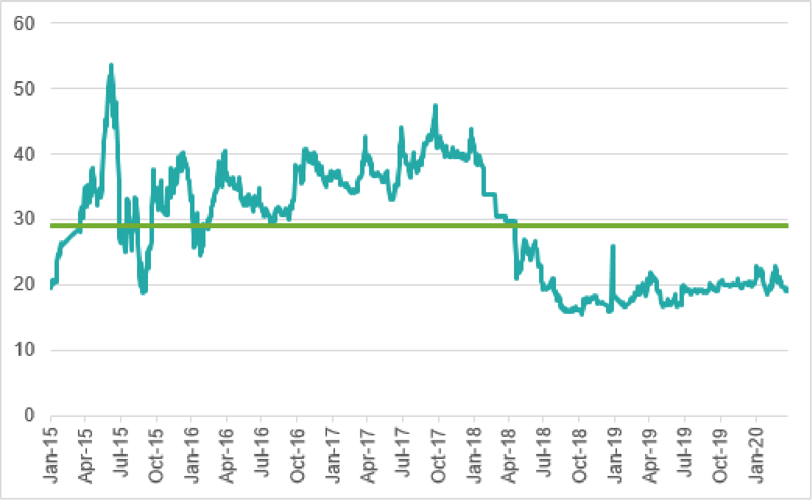
In the past 5 years, Wanfeng was traded between 15-55x P/E, with significantly de-rating trend in the past two years. In the past two years, Wanfeng's valuation fluctuated around 15-20x P/E. Based on Bloomberg consensus, Wanfeng trades at 15x P/E 2020E, which is not attractive enough. We have concern on Wanfeng's business growth in the next 5 years. Because it might take long time to see PV wheel consolidation which might be the only driver of its aluminium alloy wheel business. While its Magnesium alloy part business is not big enough to drive earnings growth yet. Entering aircraft business strengthen our concern.

Wanfeng's Consensus Forecast

(Rmb mn)	2018	2019E	2020E	2021E
Revenue	11,005	10,443	12,322	13,105
Operating profit	1,149	N.A.	N.A.	N.A.
Net Income Adj+	959	834	981	1,043
Net margin (%)	8.7%	8.0%	8.0%	8.0%
Net income growth		-13%	18%	6%
EPS Adj+	0.44	0.38	0.45	0.48
P/E	15.18	17.58	14.84	13.92

Sources: Bloomberg Last price on 23 March 2020

Wanfeng's Historical P/E (average: 29x)



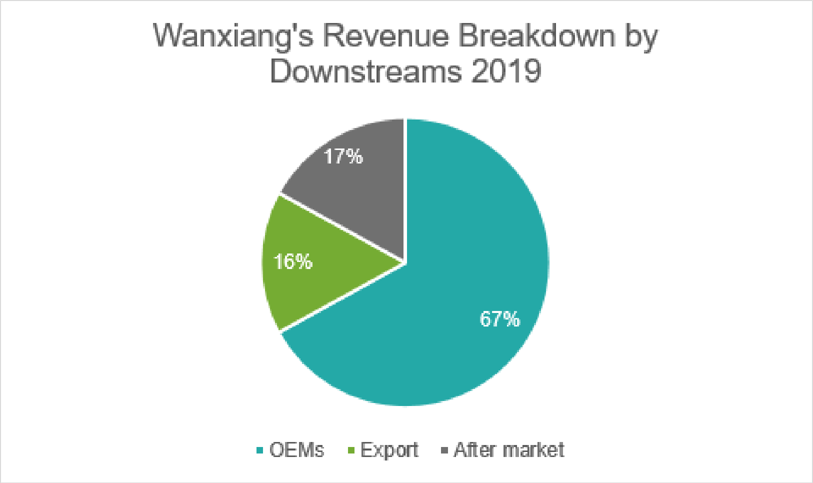
Sources: Bloomberg

Wanxiang Qianchao (000559.CH)

Background: Owned by Lu family, Wanxiang is global largest universal joint manufacturer with above 35% market share (No.2's market share is 10%). 65% of its products sell to passenger vehicle OEMs, and 35% of it sells to commercial vehicle manufacturers. In China, it has 55% market share of universal joints for vehicles, mainly JV brands OEMs. It's China's largest wheel hub supplier with 2% market share. It's also the second largest constant speed drive shift supplier in China with 13% market share(Huayu Auto's (600741.CH) SDS is the largest one). Wanxiang has four business segments: transmission (including universal joints, constant speed drive shift), bearing, after-treatment system and braking system. In 1H2019, Wanxiang had 13% sales from overseas.

Capacity bottleneck release to double earnings.

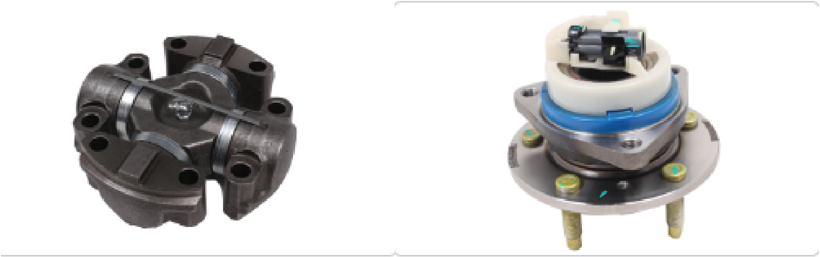
Wanxiang is the only Chinese manufacturer which can supply third generation wheel hubs which is designed to work perfectly with ABS(Anti-lock Braking System). All the other local suppliers can only produce second generation wheel hubs. Currently Wanxiang is suffering from capacity bottleneck, which forced the company turned down quite a few orders. For example, VW wants to purchase all the universal joints, wheel hubs needed from Wanxiang, but Wanxiang had to take only 70% due to capacity bottleneck. In 2019, BMW Brilliance and Beijing Benz wanted parts for 600,000 cars, but Wanxiang finally took an order for 100,000 cars. In 2018, Wanxiang had 20mn sets capacity of wheel hubs. It's building new capacity in Jiangsu, and plan to add additional 30mn sets by 2021. **The new capacity would start ramp up in 2020, and could increase Wanxiang's revenue by 1.6 times with full capacity utilisation rate.**



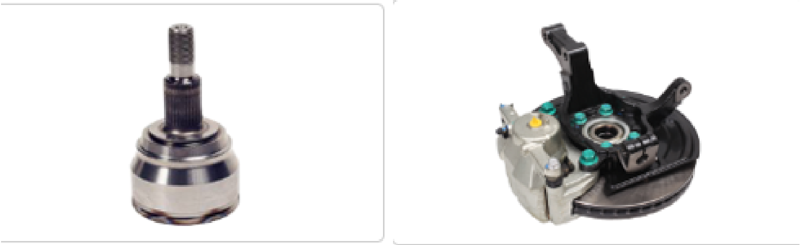
Sources: company data

Wanxiang Qianchao's Key Products

Universal joint Third generation wheel hub



Constant speed drive shift Braking system



Sources: company data

Expanding client base to luxury brands for better demand growth.

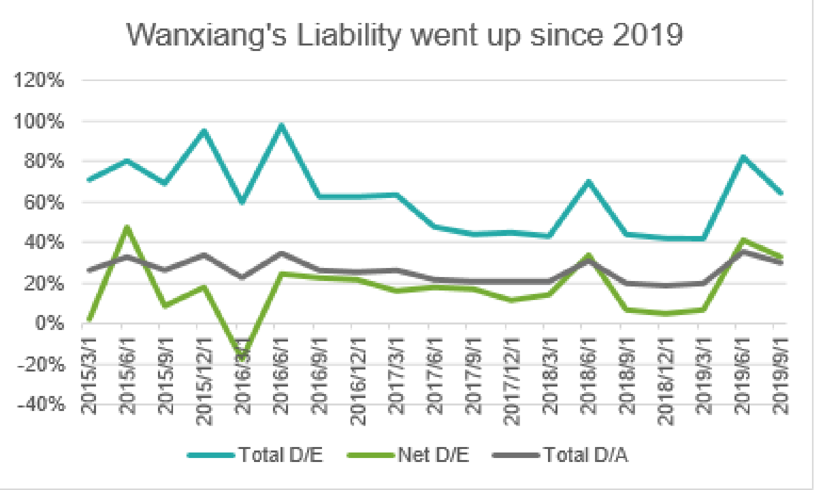
VW is Wanxiang's biggest client in China, to which Wanxiang provides 70% of parts VW needs, followed by Shanghai GM, Hyundai, Shenlong and Ford. Recently, Wanxiang entered supply chains of Japan brands, such as Honda, Nissan and Mazda; and luxury brands such as Audi, BMW and Mercedes. Once capacity bottleneck is released, Wanxiang would increase supply to luxury brands, which would have better demand than mass market products in the next 3 years.

Overseas expansion is on the way.

In Jan 2020, Wanxiang announced to build capacity in Thailand for overseas demand. This would be the company's first production base overseas. As Wanxiang's product quality is well-known by customers, we estimate Thailand plant would become an important earnings contributor once its capacity ramps up.

Financing pressure.

In 2017, Wanxiang proposed a right issue for capacity expansion, which got CSRC's approval, but failed to raise the money and the approval expired. In Jan 2020, Wanxiang proposed a private placement instead to get Rmb3bn proceeds, and all the proceeds is planned to be used as operating cashflow, which doesn't look like a very good start to us. If this placement fails again, Wanxiang might have to slow down its capacity expansion and fund it with more banking loans.



Sources: Smartkarma

Neither local broker nor international broker covered this company properly in the past 2 years since the company got problem on right issue, which lead to its historical forward P/E is meaningless. We estimate Wanxiang's earnings to grow by 40% yoy in 2020E and 65% yoy in 2021E. Last price of Rmb4.93 indicates 18.7x P/E 2020E and 11x P/E 2021E.

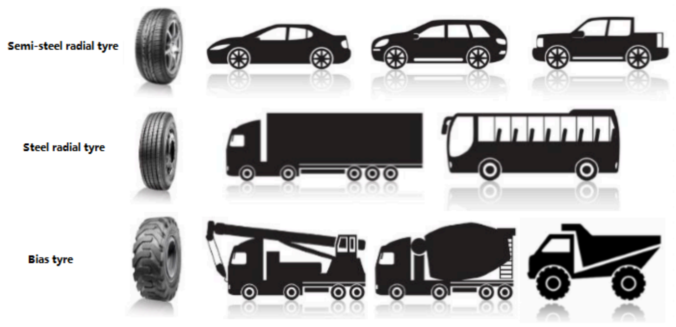
Wanxiang's Forecast

(Rmb mn)	**2018**	**2019E**	**2020E**	**2021E**
Revenue	11,362	10,112	13,146	19,719
Operating profit	802	641	847	1,312
Net Income Adj+	723	520	728	1,202
Net margin (%)	6.4%	5.1%	5.5%	6.1%
Net income growth		-28%	40%	65%
EPS Adj+	0.26	0.19	0.26	0.44
P/E	18.82	26.13	18.67	11.31

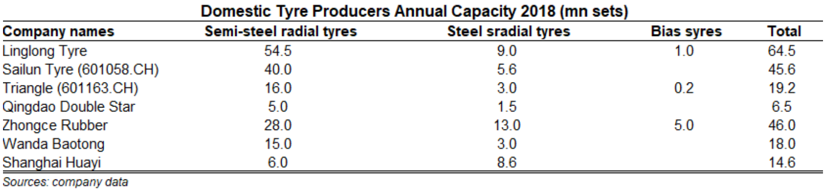
Sources: Victoria Li estimates Last price on 23 March 2020

Linglong Tyre (601966.CH)

Background: Top 4 tyre suppliers in China, owned by Wang's family. It is the largest semi-steel radial tyre supplier (by capacity) in China with best profitability among peers. It's total tyre capacity ws 64.45mn sets. In 2018, Linglong had half revenue from overseas.



Linglong's main products Sources: company data



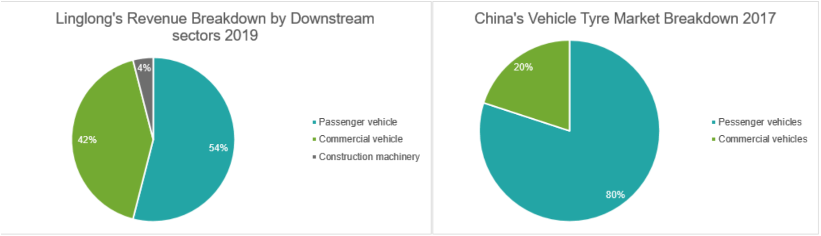
Domestic Tyre Producers Annual Capacity 2018 (mn sets)

Company names	Semi-steel radial tyres	Steel sradial tyres	Bias syres	Total
Linglong Tyre	54.5	9.0	1.0	64.5
Sailun Tyre (601058.CH)	40.0	5.6		45.6
Triangle (601163.CH)	16.0	3.0	0.2	19.2
Qingdao Double Star	5.0	1.5		6.5
Zhongce Rubber	28.0	13.0	5.0	46.0
Wanda Baotong	15.0	3.0		18.0
Shanghai Huayi	6.0	8.6		14.6

Sources: company data

Outstanding performance/price ratio is leading to market share gains from foreign PV OEMs (including JVs).

With the market recognition on Linglong's product quality and attractive prices, Linglong is entering supply chains of JV OEMs. It is now the first local tyre supplier of VW cars. It has also been accepted by GM and Ford as one of their global tyre suppliers. In China, 20% of auto tyre demand is from new cars, and 80% is from tyre replacement. In new car market, every new car needs 5 tyres. While in tyre replacement market, every car in use needs replace 1.5 tyres on average p.a. Media surveys shows that 85% of car owners choose same brands of tyres which are used on their new cars. According to Linglong, margins of semi-steel radial tyres are better than those of other tyres. **Gaining orders from PV OEMs would increase Linglong's sales upside and stability over auto sector cycles; improve Linglong's product mix and hence its profitability.**


Linglong's Revenue Breakdown by Downstream sectors 2019

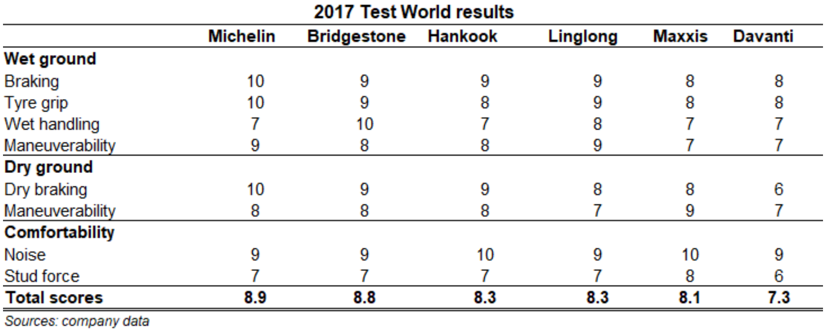
China's Vehicle Tyre Market Breakdown 2017

Sources: company data, TireChina

Comparable Tyre Prices in the market

Company names	Tyre types	Retail prices (Rmb/unit)
Pirelli	Cinturato P7 205/55R16 91V Pirelli	629
	Cinturato P1 205/55R16 91V Pirelli	532
	Cinturato P6 205/55R16 91V Pirelli	469
Michelin	ENERGY MXV8 205/55R16 91V Michelin	655
	PRIMACY 3ST 205/55R16 91V Michelin	639
Bridgestone	ER300 205/55R16 91V Bridgestone AYZ	559
	EP300 205/55R16 91V Bridgestone	439
Goodyear	Duraplus 205/55R16 91V Goodyear	438
	Assurance TripleMax 205/55R16 91V Goodyear	409
Hankook	H432 205/55R16 91V Hankook	459
	KINERGY EX H308 205/55R16 91V Hankook	349
Giti	Comfort 221V1 205/55R16 91V Giti	309
	228V1 205/55R16 91V Giti	259
Linglong	L788 205/55R16 91V Linglong	249

Sources: tuhu.com Prices on 17 March 2020



2017 Test World results

	Michelin	Bridgestone	Hankook	Linglong	Maxxis	Davanti
Wet ground						
Braking	10	9	9	9	8	8
Tyre grip	10	9	8	9	8	8
Wet handling	7	10	7	8	7	7
Maneuverability	9	8	8	9	7	7
Dry ground						
Dry braking	10	9	9	8	8	6
Maneuverability	8	8	8	7	9	7
Comfortability						
Noise	9	9	10	9	10	9
Stud force	7	7	7	7	8	6
Total scores	**8.9**	**8.8**	**8.3**	**8.3**	**8.1**	**7.3**

Sources: company data

Linglong Tyres Brands

LINGLONG TIRE
利奥轮胎
SHAN 山玲 LING
山玲轮胎
Infinity
英菲利轮胎
Benchmark
邦驰轮胎
ATLAS TIRES
CROSSWIND
GREEN MAX

Sources: company data

Overseas capacity expansion to avoid negative impact from trade war.

First overseas plant （16.8mn sets of annual capacity) came on steam in Thailand in July 2015, which helped the company avoid the US's anti-dumping and countervailing against China's tyres. In 2018, Thailand plant contributed Rmb736mn net profit, or 61% of Linglong's overall net profit. In March 2019, Linglong started construction of new plant in Serbia with designed capacity of 13.62mn sets by 2025 (12mn sets of semi-steel radial tyres, 1.6mn sets of steel radial tyres and 20000 sets of bias tyres). **We believe this new plant would increase Linglong's net profit by 40% once its annual capacity is fully utilized.**

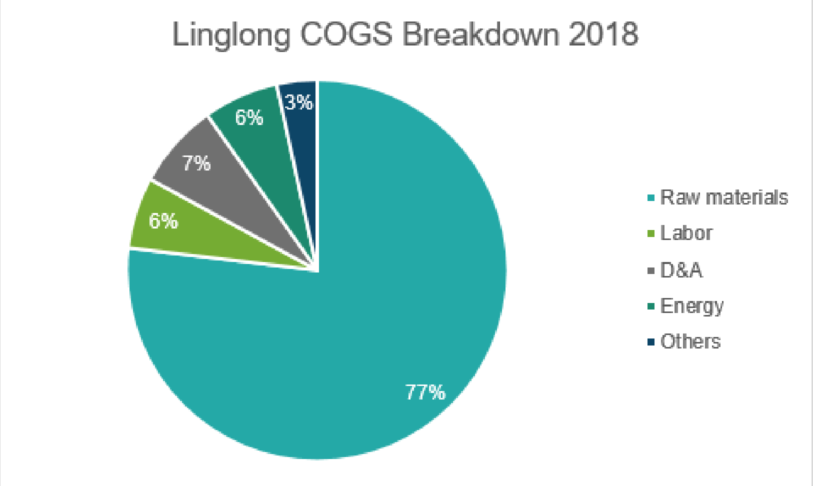
In China, Linglong is also building new capacity of 21.9mn sets. Once finished, Linglong's overall capacity would reach 100mn sets, including domestic plants and overseas plants.

Domestic industry consolidation to accelerate during weak demand period, low end suppliers to exit the market.

China's auto tyre market's relatively fragmented. The market share of the Top-4 producers was only 18.5% in 2018. Since 2017, lots of small suppliers have started to exit the market, as they could not get into OEM market due to weak brand recognition and poor product quality. This is leading to industry consolidation, and would benefit leading companies like Linglong.

Stable raw material cost to secure product profitability.

Profitability in the tyre business is sensitive to changes of raw materials which accounted for 77% of COGS in 2018. Amongst all the raw materials, cost of rubber accounts for about 42%. Given the recent collapse in oil prices and demand downturn due to Coronavirus, we see limited room for rubber price increases and see Linglong's tyre margins on a stable or improving trend



Sources: company data

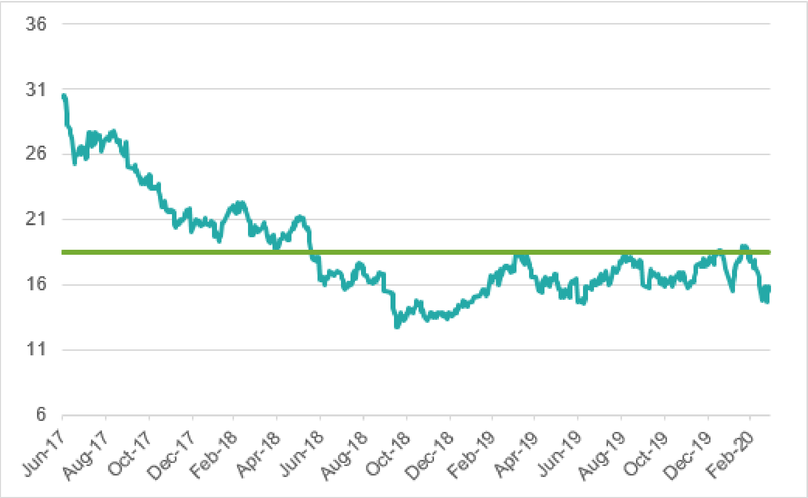
Valuation

In the past 5 years, Linglong was traded between 13-30x P/E with average of 18.5x. Based on Bloomberg consensus, Linglong trades at 12.3x P/E 2020E, which is quite attractive, vs. its historical P/E range and expected earnings growth in the next few years. Also, when Linglong's sales exposure to PV goes above 75%, a valuation rerating would probably be triggered.

Linglong's Consensus Forecast				
(Rmb mn)	**2018**	**2019E**	**2020E**	**2021E**
Revenue	15,302	17,306	19,548	21,982
Operating profit	1,493	1,669	1,935	2,285
Net Income Adj+	1,181	1,589	1,838	2,171
Net margin (%)	7.7%	9.2%	9.4%	9.9%
Net income growth		35%	16%	18%
EPS Adj+	0.98	1.33	1.53	1.81
P/E	19.20	14.20	12.29	10.40

Sources: Bloomberg Last price on 23 March 2020

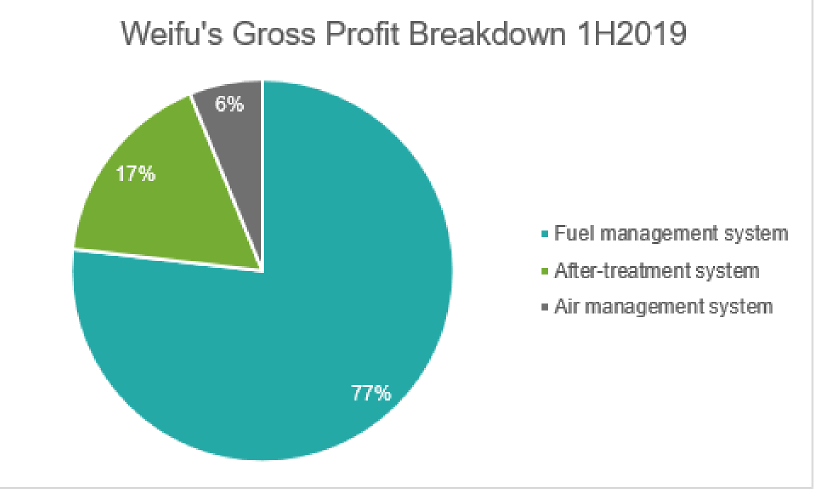
Linglong's Historical P/E (average: 18.5x)



Sources: Bloomberg

Weifu High-Tech (000581.CH)

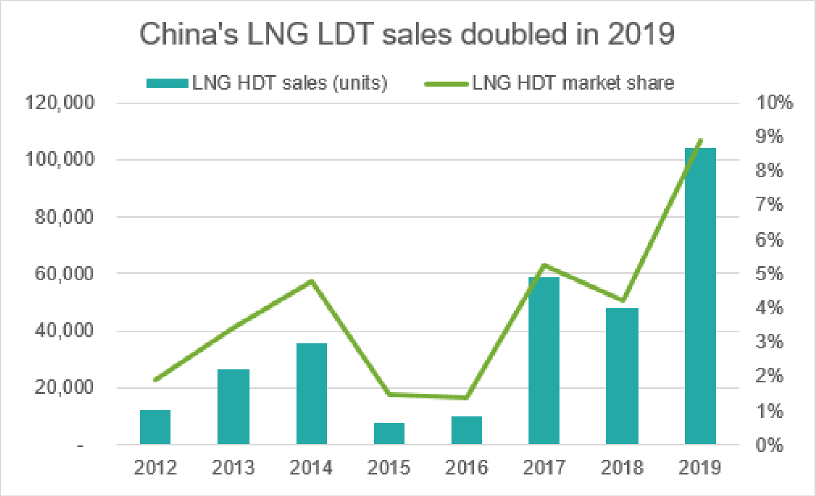
Background: Owned by Wuxi SASAC, Weifu High-Tech is leader of diesel engine fuel injection system in China. Weifu had 63% of net profit from associates, BADES(32.5% stake) and China United Electronic(20% stake) in 2018. BADES, controlled by Bosch, is the leader of high pressure common rail fuel injection system of diesel engine segment. China United Electronic's major earnings contributor is its 50% owned JV with Bosch, UAES, who produces gasoline engine management systems and transmission control system. In 1H2019, Weifu has only 4% revenue from overseas.



Sources: company data

Main businesses structurally shrinking.

In China, majority of vehicle diesel engines are used in trucks, which is expected to have stable annual sales volume in the long term. Weifu dominates the market of fuel injection system for diesel engines in China, which leads to limit market share gain possibility. However demand for LNG trucks is rising quickly in recent years, which would reduce demand on Weifu's products.



Sources: chinaautoms, Cvworld

Weifu Hi-Tech's major Products

Fuel injection system	
After treatment system	
Air management system	

Sources: company data

Exploring NEV business area for long term development.

To deal with the downside risk of its main business, Weifu's exploring business opportunities in BEV powertrain system, in-wheel electric motor and fuel battery parts.

1) In 2018, Weifu purchased 9.61% stake of Protean (sold in 2019 when Protean was 100% acquired by Virtue Surge) and founded a JV with Protean to produce powertrain system and in-wheel electric motor for BEV (Battery Electric Vehicle). As of 1H2019, the JV did not break-even.

2) In 2019, Weifu acquired 66% stake of IRD, who develops and produces key components for fuel cells. In Nov 2019, Bosch China started building fuel cell R&D center and would start trail production in 2021. Considering Weifu's close relationship with Bosch, its IRD would have close co-operation with Bosch and might benefit once Bosch starts producing fuel cells.

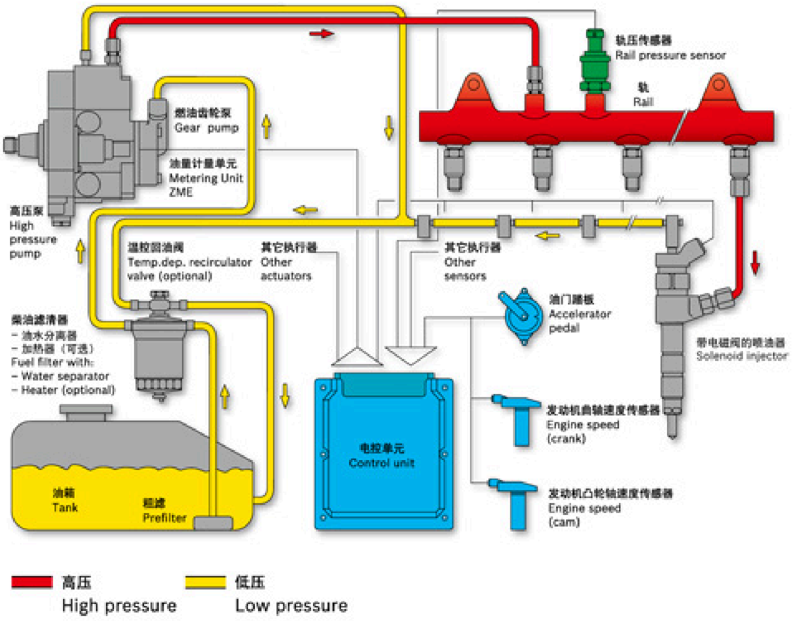
In-wheel electric motor

Sources: company data

Bosch Automotive Diesel Engine System(BADES)is the biggest earnings contributor with mild earnings growth expected.

BADES is controlled by Bosch, Weifu's second largest shareholder and strategic partner. Weifu has 32.5% of BADES. In 2018, BADES contributed 48% of Weifu's net profit. BADES's high pressure common rail system of diesel engine dominates China's truck market with 70% market share, which leads to limit upside on its product sales volume. That said, every time when a new national emission standard takes effective, an upgraded system is needed. This is the key driver of BADES's ASP and margins.

BVDES's high pressure common rail system of diesel engine



轨压传感器
Rail pressure sensor
轨
Rail
燃油齿轮泵
Gear pump
油量计量单元
Metering Unit
ZME
高压泵
High pressure pump
温控回油阀
Temp.dep. recirculator valve (optional)
其它执行器
Other actuators
其它执行器
Other sensors
油门踏板
Accelerator pedal
带电磁阀的喷油器
Solenoid injector
柴油滤清器
– 油水分离器
– 加热器（可选）
Fuel filter with:
– Water separator
– Heater (optional)
发动机曲轴速度传感器
Engine speed (crank)
电控单元
Control unit
发动机凸轮轴速度传感器
Engine speed (cam)
油箱
Tank
粗滤
Prefilter
🟥 高压
High pressure
🟨 低压
Low pressure

Sources: company data

UAES benefits from increasing car electronic penetration in PV models.

UAES (United Automotive Electronic Systems) is China United Electronic's 50-50 JV with Bosch. China United Electronic is 20% owned by Weifu, other shareholders include Dongfeng Motor, SAIC and FAW. In 2018, UAES, through Zhonglian Electronic, contributed 15% of Weifu's net profit. UAES's key products are engine management system and transmission control system for passenger vehicles, NEV powertrain products, and car eletronics. SAIC is UAES's biggest customer. It also supplies to FAW VW, Benz, Nissan, BMW and local brands. With the increasing penetration of auto electronic, UAES's earnings growth is faster than PV sales growth.

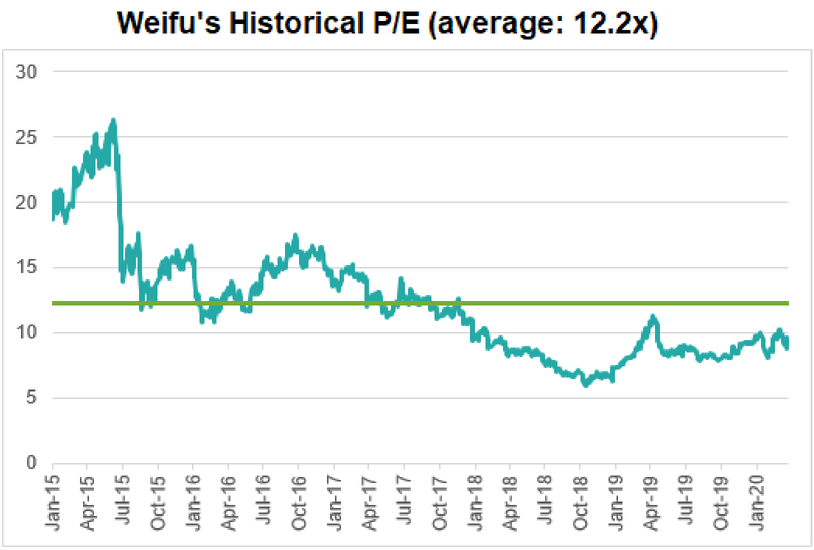
Valuation:

Weifu was traded between 6-26x P/E during past 5 years and the average valuation was about 9x in the past 3 years. Based on Bloomberg consensus, Weifu trades at 7.9x P/E 2020E, which is fair, vs. its historical P/E range and expected earnings growth in the next few years, and long term concern on its core business.

Weifu's Consensus Forecast

(Rmb mn)	2018	2019E	2020E	2021E
Revenue	8,722	8,076	8,231	8,956
Operating profit	638	1,954	2,040	2,160
Net Income Adj+	2,396	2,203	2,298	2,546
Net margin (%)	27.5%	27.3%	27.9%	28.4%
Net income growth		-8%	4%	11%
EPS Adj+	2.37	2.18	2.28	2.53
P/E	7.57	8.25	7.88	7.09

Sources: Bloomberg Last price on 23 March 2020


Weifu's Historical P/E (average: 12.2x)

Sources: Bloomberg

Disclosure & Certification

- I/We have no position(s) in the any of securities referenced in this insight
- Views expressed in this insight accurately reflects my/our personal opinion(s) about the referenced securities and issuers and/or other subject matter as appropriate.
- This insight does not contain and is not based on any non-public, material information.
- To the best of my/our knowledge, the views expressed in this insight comply with Singapore law as well as applicable law in the country from which it is posted
- I/We have not been commissioned to write this insight or hold any specific opinion on the securities referenced therein
- I/We have signed the Insight Provider Agreement and this insight does not violate any of the terms specified therein.

— Victoria Li (09 Mar 2020)

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Osbert Tang is an equity analyst with over 20 years of experience focusing on China's transport, infrastructure, industrials, and utilities sectors. He has been based in Shanghai since 2003, accumulating more than 15 years of on-ground knowledge on the Chinese economy and financial markets, and has a wealth of contacts with China corporates and government entities.

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- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: Hong Kong, China
- Sectors: Industrials, Utilities

Content Verticals

- Equity Bottom-Up, Thematic (Sector/ Industry)

Thematic (Sector/Industry)

China Infrastructure Deep Dive: Gas Utilities H & A Shares

By Osbert Tang, CFA | 31 Mar 2020

EXECUTIVE SUMMARY

China's Gas Utilities sector will continue to present a high growth story for investors, despite their significant outperformance over the last few years, in our view. The government may accelerate the push for natural gas development in its next five-year plan as an added driver for economic growth, complementing the persistent quest for environmental improvement. Meanwhile, there are challenges from margin squeeze and rise in competition, particularly induced by the change in operating landscape following the formation of China Oil & Gas Pipeline Network Corporation (PipeChina).

The sector is highly fragmented and we analyse the individual companies by looking at the opportunities, risks, Environmental, Social and Governance (ESG), financial strength, profitability and valuation to find the winners of the game. We conclude our analysis with a ranking of our preference on the stocks in the following order: ENN Energy (2688 HK), China Resources Gas (1193 HK), China Gas Holdings (384 HK), Kunlun Energy (135 HK), Shenzhen Gas Corp Ltd A (601139 CH) and Bestsun Energy Co (600681 CH).

What's Original?

This Smartkarma Original takes a deep look into the key revenue and margin drivers of the Chinese gas utilities companies and compares their respective strengths and weaknesses, in addition to the discussion of the key drivers and challenges of the sector's outlook. We also analyse the impact of PipeChina on the sector and how individual companies will be affected.

We attempt to assess the ESG performance of the gas utilities companies, given its rising importance in today's investment decisions, and see how they are doing. Besides the Hong Kong-listed gas companies, we investigate the fundamentals and investment thesis of two A-shares, namely, Shenzhen Gas Corp Ltd A (601139 CH) and Bestsun Energy Co (600681 CH). We will also briefly discuss ENN Ecological Holdings (600803 CH), an A-share listed in Shanghai currently under a proposed transaction to acquire a controlling 32.83% stake in ENN Energy (2688 HK).

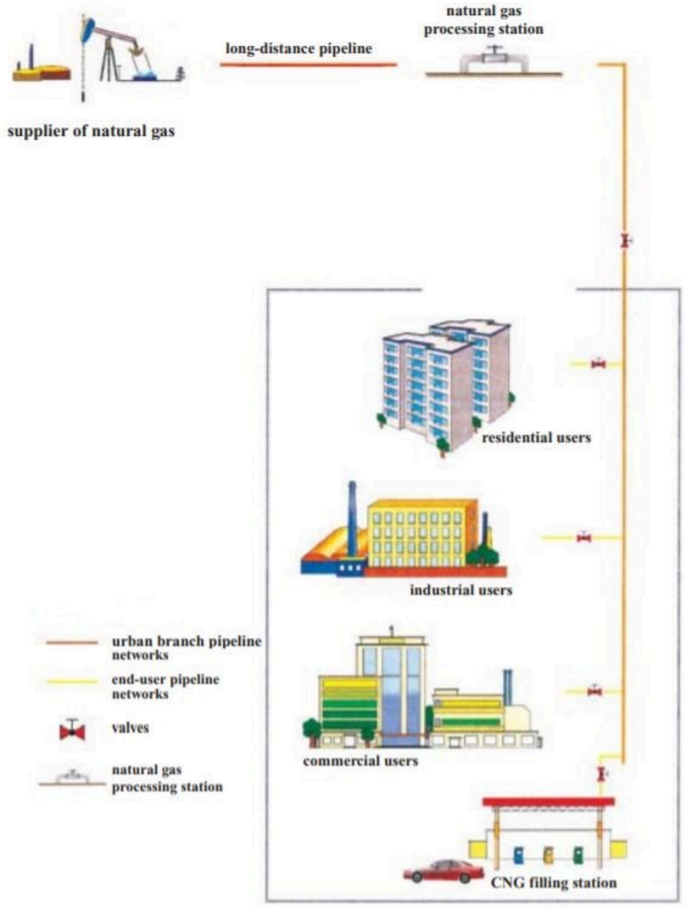
DETAIL

Background

In this Smartkarma Original, we will explore the investment thesis of the gas utilities companies. To facilitate our analysis, we first introduce the value chain of the natural gas business below (Figure 1). The key components of this value chain include:

1. Upstream: Supply of natural gas from gas fields or through LNG import;
2. Midstream: Transmission of natural gas by long-distance pipelines;
3. Downstream: Distribution of natural gas to end-users, and this is the focus of this Smartkarma Original.

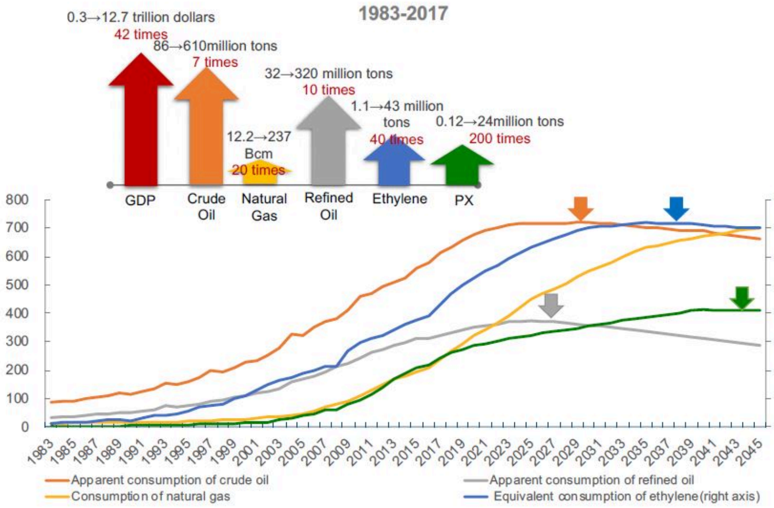
Figure 1: The natural gas value chain


natural gas processing station
long-distance pipeline
supplier of natural gas
residential users
industrial users
urban branch pipeline networks
end-user pipeline networks
valves
natural gas processing station
commercial users
CNG filling station

Source: Tian Lun Gas

According to projections by China Petroleum & Chemical (386 HK), natural gas consumption will continue to grow at a rapid pace until peaking out in 2045 (Figure 2). Having said that, we believe natural gas utilities companies present very interesting investment thesis for investors.

Figure 2: Projection of consumption of natural gas



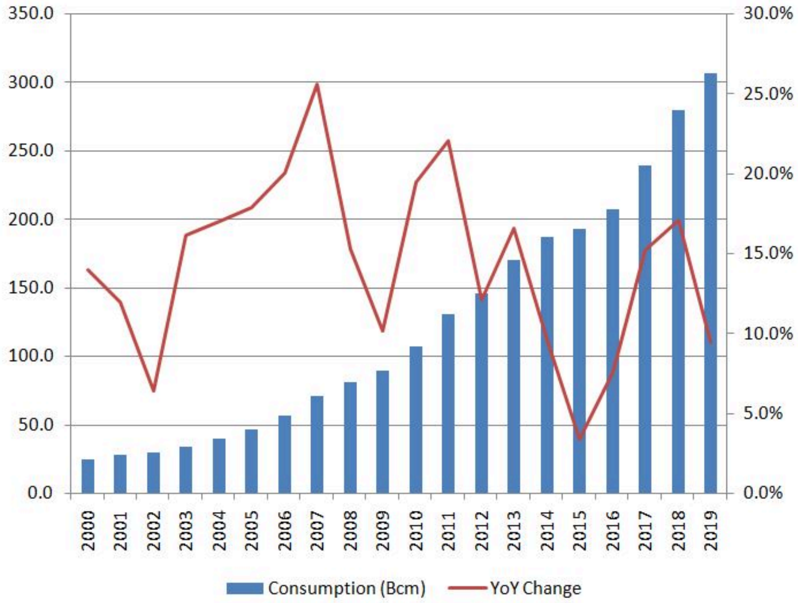
Source: Sinopec

We now move to analyse the key drivers and challenges, the impact of the formation of PipeChina, their relative valuations and the opportunities and risks faced by each company. We will also address how they fare on ESG measure, given that this is of increasing importance in today's investment decision-making process.

Key drivers

Acceleration of use of clean energy in next 5 year. The single most important driver for the gas utilities companies is definitely the government's clean energy drive in view of the environmental concerns. China's consumption of natural gas has increased by a CAGR of 10.4% since 2014 to reach 306.7Bcm in 2019 (Figure 3), thanks to the government's various initiatives to boost demand. These include the push of coal-to-gas conversion, promotion of the use of clean energy vehicles and support of the use of gas in power generation.

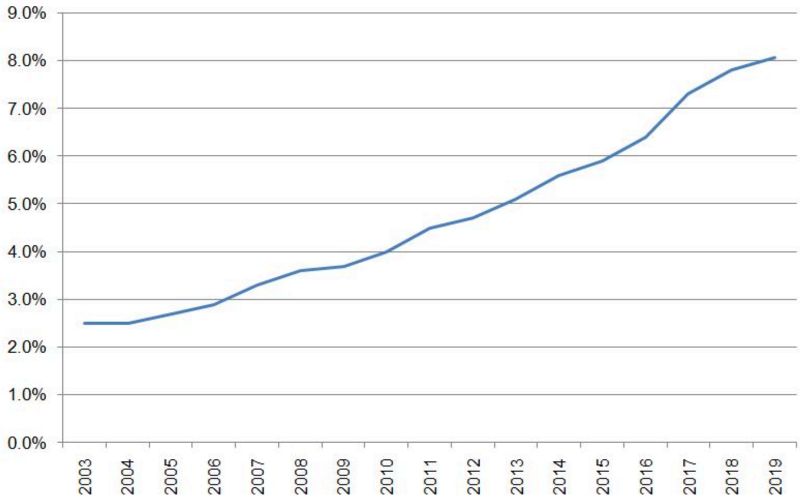
Figure 3: Growth in China's natural gas consumption



Source: Eastmoney Choice database

Under the 13th Five-year Plan of China (2016-2020), the government targets to have natural gas accounts for 8.3-10% of China's total primary energy consumption by 2020. However, as of 2019, such proportion only stood at 8.1% (Figure 4). The pace is lower than the government's intention partly due to the gas shortage in winter 2017 which has slowed the pace of coal-to-gas conversion. While there is room for natural gas consumption to catch up in this year, the Covid-19 outbreak has slowed down various related construction work. As a result, China is likely to end 2020 with the natural gas-to-total primary energy ratio at the low end of its five-year target.

Figure 4: Natural gas as a percentage of total energy consumption



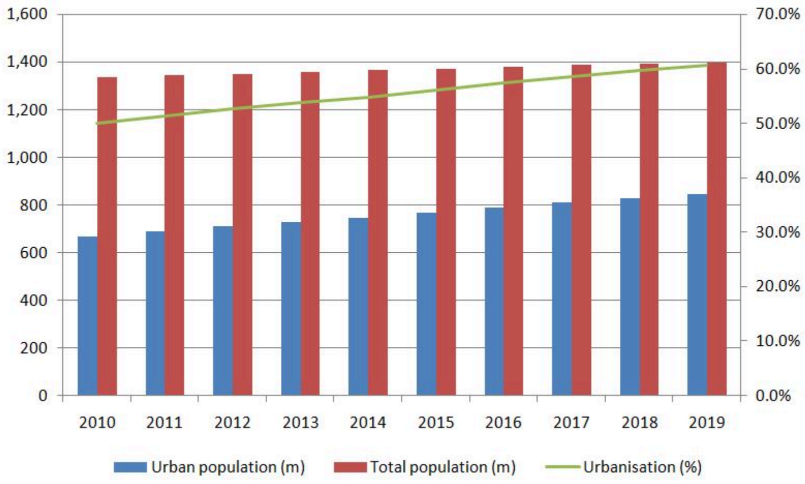
Source: Eastmoney Choice database

We do not believe the disruption by these exceptional events to change China's attitude of increasing the use of natural gas. Instead, given that the usage of natural gas is slightly short of the government's target in the current five-year plan, we believe it is very possible that this will accelerate in the next five-year plan to catch up with the hole left in the previous one. This is likely to be driven by more supportive government policies to promote natural gas usage. The post-outbreak stimulus package with increase in infrastructure investment will also support the penetration of natural gas amongst the end users.

Urbanisation to drive gas demand. One important driver of China's gas consumption is the increase in urbanisation. Over the last ten years, China's urban population has increased by 26.7% (vs. total population growth of only 4.4%). In the same period, total gas consumption rose by 186.8%.

Although urbanisation rate has increased from 49.9% in 2010 to 60.6% in 2019 (Figure 5), the level is still lower than developed countries like the US and the UK which are above 80%. China has put forward more efforts in driving urbanisation in the country. In Dec 2019, China's State Council announced the government's policy to remove restrictions on household registration "hukou" in cities with a population of less than 3m and the relaxation of 'hukou" restrictions in cities with population of 3-5m. This is an excellent example of the government's effort on supporting urbanisation.

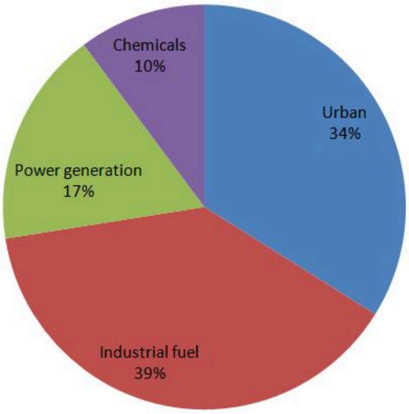
Figure 5: China's urbanisation rate



Source: National Bureau of Statistics (NBS)

The move of rural population into the urban area does not only stimulate the usage of gas in the residential sector, but also pulls the demand in the commercial sector like those used in restaurants, hotels and shopping malls. Urban usage accounted for about 34% of total gas consumption in China (Figure 6), and this portion of the pie will be the most benefited from the rising urbanisation. Moreover, this trend will also drive the country's power demand which accounted for 17% of the total gas consumption; adding to the increase in gas-fired power generation in China.

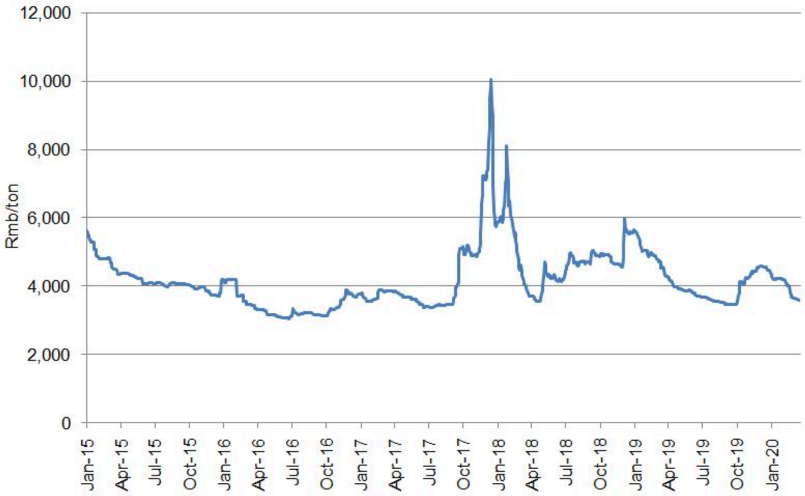
Figure 6: Natural gas consumption by sector



Source: China Natural Gas Development Report 2019

Secured gas source to ease supply fluctuation. The gas shortage in the winter of 2017 is still a painful memory for many gas utilities companies. The combination of the acceleration of coal-to-gas conversion projects due to policy targets, the reduction of gas supply from Central Asia and the breakdown of LNG receiving terminal has led to an exceptional shortage of gas supply starting from Oct 2017. This resulted in a spike in natural gas price from below Rmb5,000/ton in early-Oct to a peak of Rmb10,000/ton in mid-Dec (Figure 7). With the input price more than doubled, the gas utilities are unable to timely shift the rise in cost to the end-users, leading to significant margin pressure during that period of time. After this gas shortage incident, the government has slowed the pace of coal-to-gas conversion to reduce the demand side shock to the gas market.

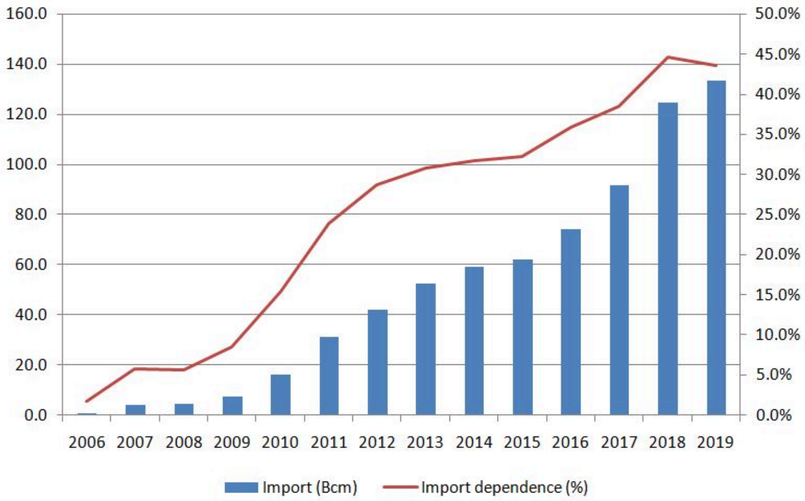
Figure 7: LNG price



Source: Eastmoney Choice database

China's dependence on imported natural gas has consistently increased since it became a net importer of natural gas in 2012 (Figure 8). Its import dependence reached 44.6% in 2018, and only declined slightly to 43.6% in 2019. Given such high import dependence, maintaining a secured and stable gas supply is a number one priority for the gas utilities companies.

Figure 8: China's dependence on import natural gas



Source: NBS, Esatmoney Choice database

As an effort to secure gas supply, the government has speed up the construction of gas pipeline and LNG Terminals. The completion of the northern section of the Russia-China East Line in Dec 2019 has significantly enhanced the capacity of pipeline gas import. The full completion this pipeline in 2024 is expected to bring an additional 38Bcm of natural gas transmission capacity between Russia and China, or raising the capacity by nearly 40%, providing a secured source of China's natural gas import.

Besides pipeline enhancement, China has been actively constructing LNG Terminals to receive LNG from its key sources including Australia, Qatar and Malaysia via LNG vessels. We estimate that additional LNG Terminals with capacity of over 27m tons will be commissioned over the next three years (Figure 9), representing a 36% increase from a capacity of about 76m tons in 2019.

Figure 9: LNG Terminals in operations and under construction in China

Project	Operating entity	Annual designed capcity (m ton)	Commence operations
Guangdong Dapeng	CNOOC	6.8	2006
Fujan Putian	CNOOC	6.3	2009
Shanghai Yangshan	Shenergy	3.0	2009
Dalian	PetroChina	3.0	2011
Jiangsu Rudong	PetroChina	6.5	2011
Zhejiang Ningbo	CNOOC	3.0	2012
Dongguan Jiufeng	Jiufeng	1.5	2012
Tianjin Floating	CNOOC	2.2	2013
Tangshan	PetroChina	6.5	2013
Zhuhai	CNOOC	3.5	2013
Qingdao	Sinopec	6.0	2014
Hainan Yangpu	CNOOC	3.0	2014
Hainan	PetroChina	0.3	2014
Guangxi Beihai	Sinopec	3.0	2016
Jieyang	CNOOC	2.0	2017
Qidong	Guanghui	1.2	2017
Shanghai Wuhaogou	Shenergy	1.5	2017
Tianjin	Sinopec	3.0	2018
Shenzhen Dafu	CNOOC	4.0	2018
Zhoushan	ENN Group	3.0	2018
Guangxi Fangcheng	CNOOC	0.6	2019
Shenzhen Energy Reserve	Shenzhen Energy	1.0	2019
Jiangyin	Zhongtian	2.0	2019
Qingdao (Phase 2)	Sinopec	4.1	2019
Qidong (Phase 3)	Guanghui	1.9	2020
Yantai Floating	CNOOC	3.0	2020
Zhejiang Ningbo (Phase 2)	CNOOC	3.0	2020
Jiangsu Rudong (Phase 3)	PetroChina	3.5	2021
Zhoushan (Phase 2)	ENN Group	2.0	2021
Fujian Zhangzhou	CNOOC	3.0	2021
Yeyang	Yueyang LNG	2.0	2021
Longkou Nanshan (Phase 1)	CNOOC	5.0	2022
Guangzhou	Guangzhou Gas	1.0	2022
Wenzhou	Sinopec	3.0	2022

Source: Various news reports

The increase in gas pipeline and LNG Terminal capacity will allow China to secure its gas supply to cope with the rising demand. In our view, this will drive further expansion of the gas utilities companies. A secured supply will not only allow them to have sufficient gas to serve customers, but also achieve a stable price for their upstream input. Without a steady supply, they will be unable to satisfy end-user demand and will need to slow down their expansion pace. A secured supply will also ease the concern on margin shock due to a spike in gas price induced by a supply shortage.

M&As to drive more industry consolidation. The gas utilities industry in China is highly fragmented, and we estimate the largest player in the market only has a market share of less than 10%. This is primarily due to the fact that gas supply tends to be more localised, especially in terms of their regulations and the close tie to individual property developers. As a result, there are many small companies operating in this sector.

Historically, the smaller operators can survive due to the high connection fee and their local networks. However, after the gas shortage in winter 2017 which put pressure on margin and profitability, many of them are unable to survive. As a result, there is an acceleration of M&As in the industry (Figure 10). We expect that upon the consolidation of the pipeline assets by PipeChina, the smaller companies will find it increasingly difficult to compete and will provide more targets for acquisitions.

Figure 10: Recent gas utilities M&A transactions

Date	Company	Details	Total value (Rmb m)
Feb-2020	ENN Energy	Acquisition of 80% interest in Anhui Anruisheng Energy	13.8
Dec-2019	Shenzhen Gas	Acquisition of Cixi Haichuan gas project	N/A
Oct-2019	Kunlun Energy	Acquisition of 17 gas companies from Jinhong Holdings	1,660
Oct-2019	China Resources Gas	Acquistion of city gas projects in Taiyuan, Shanxi	N/A
Oct-2019	Bestsun	Acquisition of Zhuolu Dadi Gas and Suizhong Daidi Pipeline	220.0
Aug-2019	China Resources Gas	Formation of JV with Ningbo government and Guangxing Gas	N/A

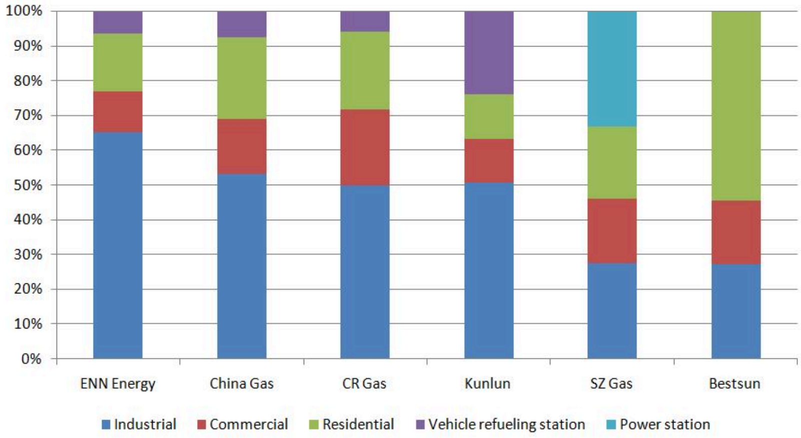
Source: Various news reports and company announcements

Another potential source of acquisitions is the gas supply businesses owned by local governments. These are normally the lower tier cities which gas supply is historically provided by the governments. Due to their tight financial position, the local pipelines and distribution facilities are dated and need renovation or upgrade to satisfy the rising customer demand. These local government owned gas companies are in need of capital but are of low efficiency due to their government nature. They represent attractive targets for the listed gas companies which can improve their operations and profitability after acquisitions. There are many such acquisitions in the last two years and we believe the continuation of this trend will raise industry concentration. Although organic gas sales are still expected to grow at 8-10% annually in the medium term, gas utilities companies will increasingly depend on M&As to drive their profit growth.

Key challenges and risks

Outbreak to impair gas volume and margin in 2020. The outbreak of Covid-19 has put a brake on gas sales in China in Feb as lockdown of cities has significantly reduced gas usage of the commercial and industrial (C&I) sectors. Although part of such demand has shifted to the residential sector as customers changed to spend most of their time at home, this is still unable to totally offset all the C&I losses. In fact, most of the gas utilities companies derive higher portion of their gas sales (between 50-80%) from C&I customers than residential customers (Figure 11).

Figure 11: Breakdown of gas sales by customers segment



Source: Company data, Osbert Tang estimates

In addition to volume loss, on 22 Feb 2020, the National Development and Reform Commission (NDRC) issued "Notice on temporary reducing non-residential gas cost to support the resumption of operations of enterprises", guiding the reduction of gas price of non-residential customers until 30 Jun 2020. Various local governments have then rolled out the details of price reduction, with most of them implementing a 10% cut in price over the next few months (Figure 12). While the measures will only be temporary, the margin and profitability for the gas utilities companies will be negatively affected in 1H2020. Depending on the timing of when Covid-19 outbreak outside of China turned under control, C&I gas sales in FY20 will likely to stay below the levels in last year.

Figure 12: Key announcements on lower retail gas prices

Location	Details	Source
Hubei	Reduce gas price by 10% from Jan 1 to Jun 30	https://www.snbu.cn/remen/shizheng/650149.html
Zhejiang	Reduce industrial gas price by 10% for 3 months	http://news.cableabc.com/society/20200212725594.html
Sichuan	Gas price for non-residential users reduced from Rmb3.36/cu.m. to Rmb3.02/cu.m. from Feb 22 to Jun 30	http://finance.sina.com.cn/roll/2020-03-17/doc-iimxxstf9655903.shtml

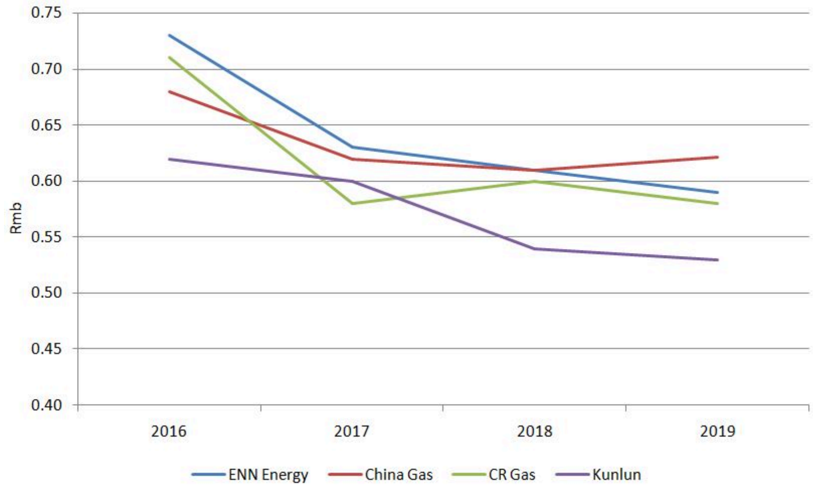
Jiangxi	Non-residential gas price reduced by 10% from Mar 1 to Jun30	http://drc.jiangxi.gov.cn/art/2020/3/11/art_14591_1574300.html
Anhui	Gas price for small and medium enterprises reduce by 10% for Feb-Apr	http://ah.people.com.cn/n2/2020/0310/c358266-33865285.html
Chongqing	Gas price for main city area reduced from Rmb2.308/cu.m. to Rmb2.077/cu.m., non-main city area price reduced by 10%, for Feb and Mar	http://chongqing.163.com/20/0210/08/F50RML0C04218FF3.html
Shanghai	Non-residential gas price reduced by 10% from Feb 22 to Mar 31, by 5% from Apr 1 to Jun30	http://www.ljzfin.com/news/info/54039.html

Source: Various news reports and local NDRCs

Back in mid-2018, the NDRC also issued the "Notice on streamlining the city-gate prices of residential users" to align the residential and non-residential natural gas city-gate prices. The impact is an increase in procurement costs for the gas utilities because, on average, the residential price was about 20% below non-residential. The adjustment that time was limited to a maximum of Rmb0.35/cu.m., with anything above to be adjusted a year later. While part of the higher price can be shifted to the end-users, this has nonetheless reduced dollar margin in 2019 and may still have some impact in 2020.

Over the last three years, the average dollar margin of gas utilities companies has been gradually coming down (Figure 13), despite a relatively stable natural gas price (except for the winter in 2017). An increase in competition is likely to keep this trend continues, but this will be at a manageable pace. We believe the weakening of the global economies will likely to affect demand from the C&I customers over the next twelve months. Despite the fact that many of these customers have already signed longer term contracts with the gas utilities companies, the adverse operating environment will mean more pressure to offer discount to them. This will add to the government's announced temporary price cut measures and will increase pressure on the dollar margin.

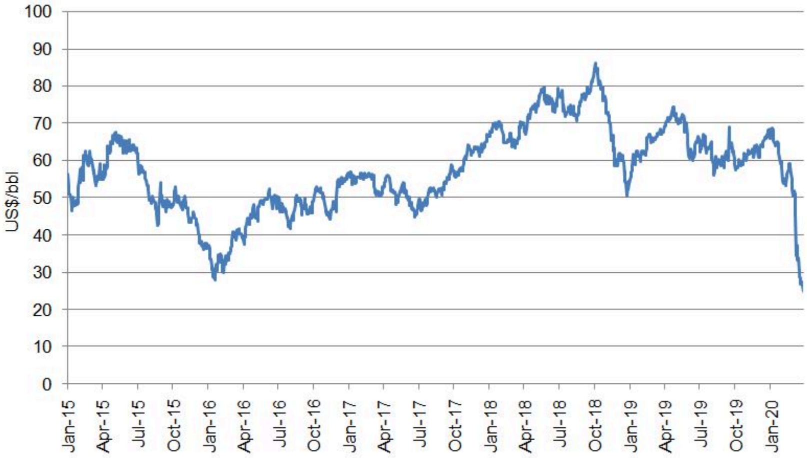
Figure 13: Historical trend of dollar margin



Source: Company data

The recent plunge in oil price will also erode the comparatively pricing advantage for natural gas (Figure 14). There are many limitations for the commercial sector to switch from gas consumption to oil. However, for industrial customers with flexibility, the switch to oil usage during the current period of depressed oil price will prove to be beneficial to their cost. The resultant loss in gas volume is expected to be negative to the gas utilities companies.

Figure 14: Brent oil price



Source: Bloomberg

Connection fee under sustained pressure. In mid-2019, the NDRC announced its decision to regulate the connection fee for urban gas supply. According to the announcement, the local price bureaus are responsible for monitoring the implementation of this change and the pricing management. Specifically, the NDRC stated that the connection fee need to be reasonable and in principle, should not be more than 10% over the costs. Local governments have started to announce the details of the reduction in connection fee in 2H19 and many of these changes are effective in Dec-2019 and early-2020 (Figure 15). In terms of percentage change, the range is roughly between 10-25% depending on the location and type of properties.

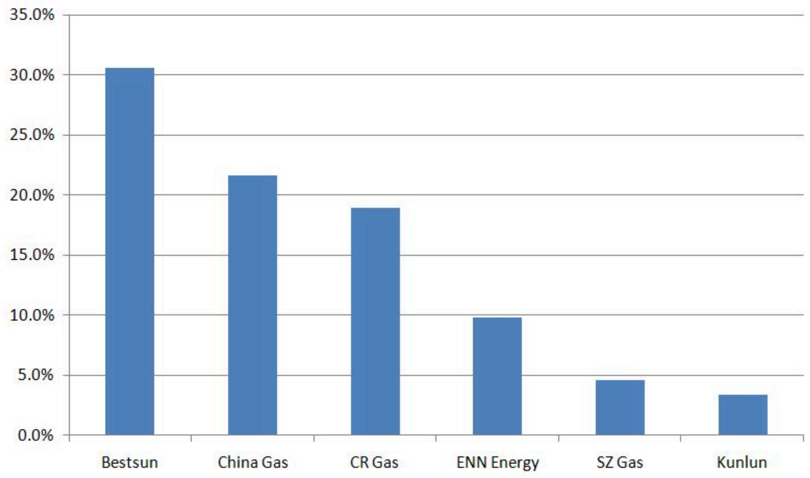
Figure 15: Recent announcement of connection fee reduction

Date of adjustment	Location	Connection fee before adjustment (Rmb)	Connection fee after adjustment (Rmb)	% Reduction
2019/9/29	Pingxiang, Jiangxi	2,900	2,200	-24.1%
2019/11/1	Shouyang, Shanxi	4,500	3,900	-13.3%
2019/12/1	Nanjing, Jiangsu	2,600	2,200	-15.4%
2020/1/1	Hefei, Anhui	2,700	2,060	-23.7%
2020/1/1	Taizhou, Zhejiang	2,500	2,000	-20.0%

Source: Various news reports and local NDRCs

We believe the change in connection fee is a key challenge for the gas utilities companies, given its importance in their profit mix. The proportion of connection fee to the total revenue varies significantly among the gas utilities companies, ranging from 4% to 31% based their latest financial reports (Figure 16). Although this is lower than the revenue from gas sales, it is important to their bottom line given the high margin of connection fee. In addition, due to its nature as a one-time upfront payment, connection fee has a significant impact on the operating cash flow of these utilities companies.

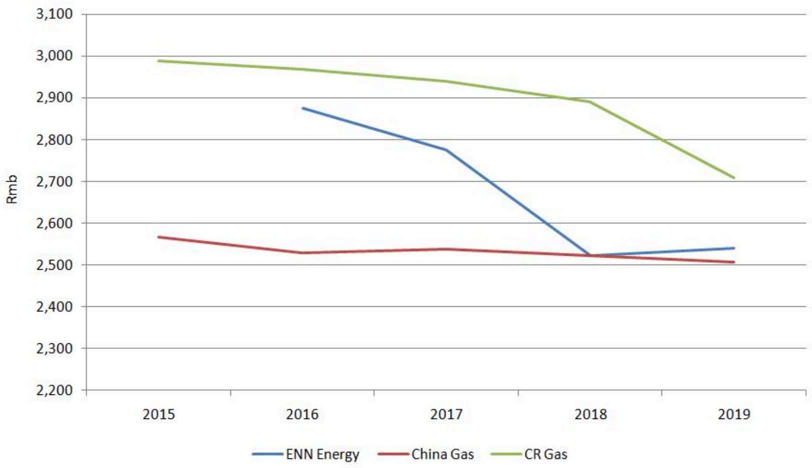
Figure 16: Percentage of revenue from connection fee



Source: Company data, Osbert Tang estimates

Over the last five years, average connection fee has consistently coming down. For example, between 2014 and 2018, for China Gas, the decline was 2.3%; and for CR Gas, the drop was 14.2% (Figure 17). This highlights the trend for the increase in competitive pressure faced by the gas utilities and the government's intention to heighten regulations. The new connection fees announced by the local governments are mostly around the Rmb2,000-2,200 level so far, compared with around Rmb2,500 reported by the companies in 2018. Although these companies have locked in some of the installation contracts in 2019 to protect the downside, we expect connection fee profit will still see pressure in this year and next.

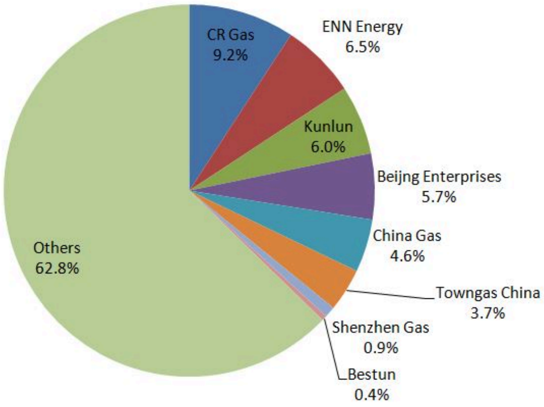
Figure 17: Trend of connection fee changes



Source: Company data

Competition may escalate in a fragmented industry. The fragmented nature of the gas utilities business is expected to get worse before it gets better. The top five listed players in the market accounted for an aggregate of 32% market share in China, meaning that on average they have only around 6% of the market (Figure 18). There are numerous small regional and city-level players opting for a slice of the market, given the high profitability and return on the businesses. Many of the big companies achieved ROE of over 15%, making it attractive for competitors to enter.

Figure 18: Breakdown of total gas sales by key gas utilities companies



Source: NBS, Company data

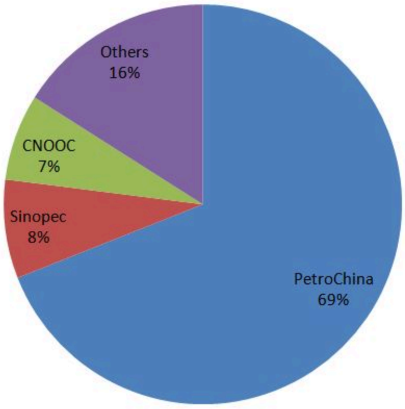
The establishment of PipeChina is expected to make it easier for downstream gas companies to access gas supply and this will remove a major hurdle for entering the gas utilities market. Given that the investment of individual gas projects is typical below Rmb100m, these are affordable levels for small private enterprises. That said, we believe the PipeChina-induced change in competitive landscape will lead to more new players and escalate the competition in the industry.

PipeChina will change the competitive landscape

The formation of PipeChina as a central State-owned Enterprise is a major milestone for China's natural gas industry. It is expected that the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) will have a controlling ownership in PipeChina, with China National Petroleum Corporation (CNPC), China Petrochemical Corporation (Sinopec) and China National Offshore Oil Corporation (CNOOC) owning the remaining stakes based on the asset value of their oil and gas pipelines. PipeChina will help the government to pursue its plan to reshape the oil and gas industry landscape using the 'X+1+X' model, meaning to promote competition in the upstream and downstream segments but controlling the midstream segment.

The establishment of PipeChina will free the big three oil companies from pipeline related capex and focus their resources on upstream and downstream businesses. Currently, PetroChina and its parent CNPC have the largest share of pipeline in China at 69% (Figure 19).

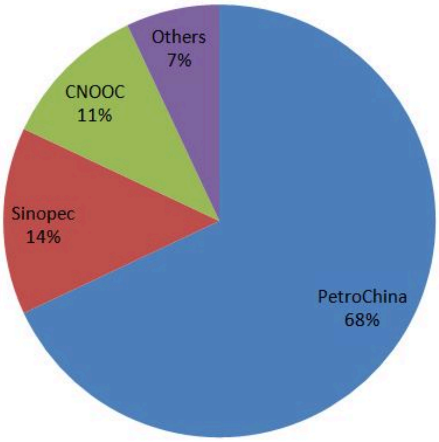
Figure 19: Breakdown of market share in mid-stream pipelines by length



Source: NBS, Company data

PipeChina will become the sole owner for the pipeline asset after the completion of restructuring. The change will reduce the bargaining power of the upstream oligopolies, particularly PetroChina (Figure 20), and provide room for increase in competition in the upstream gas supply.

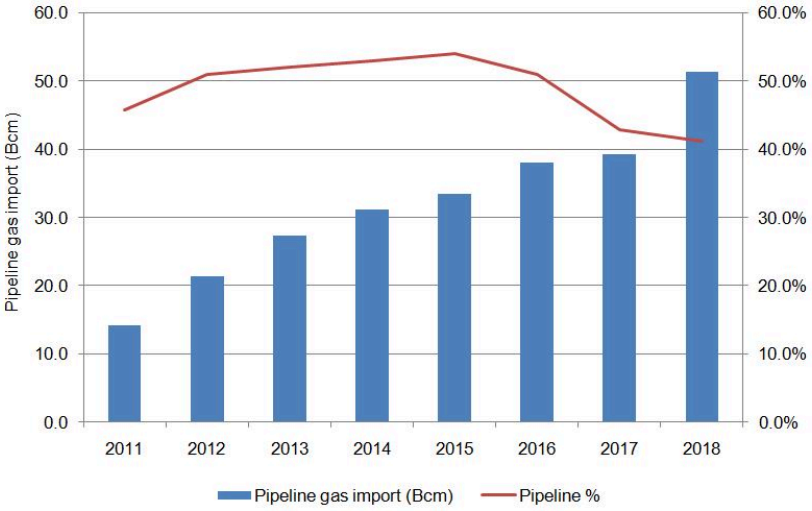
Figure 20: Breakdown of market share in upstream natural gas production



Source: NBS, Company data

By centralising the pipeline ownership on PipeChina, it can remove duplicated investments and improve the operational and investment efficiency of China's oil and gas pipelines. PipeChina is also expected to introduce social and private capital as strategic shareholders following the completion of asset consolidations, with the ultimate plan of an IPO. Given that pipeline gas still account for a significant 41% of China's total natural gas import in 2018 (Figure 21), the enhancement of the pipeline network is extremely important in China's gas supply security. Currently, China has five key pipelines for natural gas import and is building the Central Asia-China D Line and Russia-China Far East Line (Figure 22).

Figure 21: Import trend of pipeline gas



Source: NBS, Eastmoney Choice database

Figure 22: Key pipelines for China's natural gas import

Pipeline	Gas sources	Capacity (Bcm/year)	Completion
Central Asia A Line	Turkmenistan,Uzbekistan and Kazakhstan	15	2009
Central Asia B Line	Turkmenistan,Uzbekistan and Kazakhstan	15	2010
Central Asia C Line	Turkmenistan,Uzbekistan and Kazakhstan	25	2014
China-Myanmar Line	Myanmar	12	2013
Russia-China East Line	Russia	38	2019
Central Asia D Line	Turkmenistan	30	2020
Russia-China Far East Line	Russia	10	2023

Source: China Natural Gas Development Report 2019

At the end of 2018, China has total natural gas pipeline length of 79,000km (Figure 23). According to the "Medium-to-long term oil and gas pipeline plan" jointly announced by the NDRC and the National Energy Administration, this is targeted to increase at a CAGR of 9.8% for 2015-2025 to 163,000km in 2025.

Figure 23: Length of oil & gas pipelines in China

Type (in km)	2015A	2018A	2020F	2025F	10-year CAGR
Natural gas	64,000	79,000	104,000	163,000	9.8%
Crude oil	27,000	29,000	32,000	37,000	3.2%
Refined oil	21,000	28,000	33,000	40,000	6.7%

Note: 2020F and 2025F figures are government targets. Source: National Development and Reform Commission, National Energy Administration

The formation of PipeChina will change the competitive landscape for the downstream gas utilities companies. With the "X+1+X" system in place, the downstream gas utilities will have more diversified accesses to upstream gas supply. In addition, this will increase the resources for the investment in the gas pipeline, which will enhance the reach of natural gas to provincial gateway and improve the access to the final consumers.

This new system, however, will likely to be a double-edged sword to the gas utilities companies. On one hand, they can source their natural gas at a more competitive price, which will effectively lower their cost of gas supply. On the other hand, it will also increase the attractiveness of the downstream gas business, which is already highly fragmented and competitive.

On this backdrop, we believe the downstream gas companies which have a more established market share, stronger financial position and more extensive M&A experience will be able to survive the change. Higher market share will allow them to have a better bargaining power for cheap gas input. Stronger financial position will enable them to build their gas infrastructure like LNG terminals and storage. Extensive M&A experience will help them to consolidate smaller players to improve their scale economies.

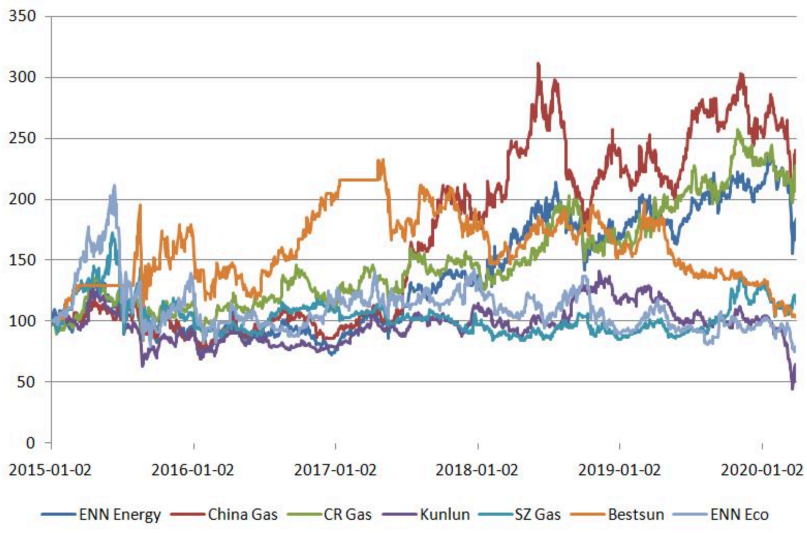
Valuation comparison

We will analyse seven companies in our valuation analysis below. They are ENN Energy (2688 HK) (ENN), China Resources Gas (1193 HK) (CR Gas), China Gas Holdings (384 HK) (China Gas), Kunlun Energy (135 HK) (Kunlun), Shenzhen Gas Corp Ltd A (601139 CH) (SZ Gas), Bestsun Energy Co (600681 CH) (Bestsun) and ENN Ecological Holdings (600803 CH) (ENNE).

With the exception of Kunlun, share prices of the Hong Kong-listed gas utilities companies covered in this Smartkarma Original have experienced a strong run in the last five years, rising by between 85% and 133% (Figure 24). The sector's solid performance was driven by the increase in gas consumption as well as the earnings contribution from geographical expansion and project acquisitions. As for Kunlun, the weakness in share price is primarily a result of the downward tariff adjustment for its mid-stream pipeline and the collapse in oil price in this year.

For the A-share companies, their performance over the last five years is less spectacular than the Hong Kong listed counterparts, partly due to the underperformance of the overall A-share market relative to the Hong Kong market. Moreover, these A-share companies tend to be smaller in size and focus on a narrower region with less diversified geographical coverage. However, when compared with the Shanghai Composite, they have still outperformed in the last five years on their more stable earnings.

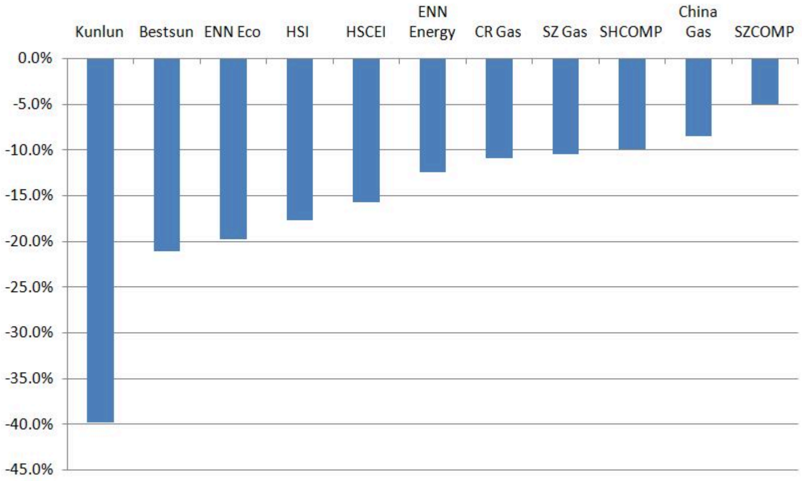
Figure 24: Relative share price performance of gas utilities companies (Indexed)



Source: aastocks

Compared with many other sectors, the gas utilities sector is less affected by the Covid-19 outbreak as the companies can derive higher sales from the residential sector where daily activities of the residents are confined to their own apartments. However, concerns on their C&I sales and the drop in oil price have not prevented a collapse in their share prices. On average, the share prices of the gas utilities companies have come down by 17.6% YTD (Figure 25).

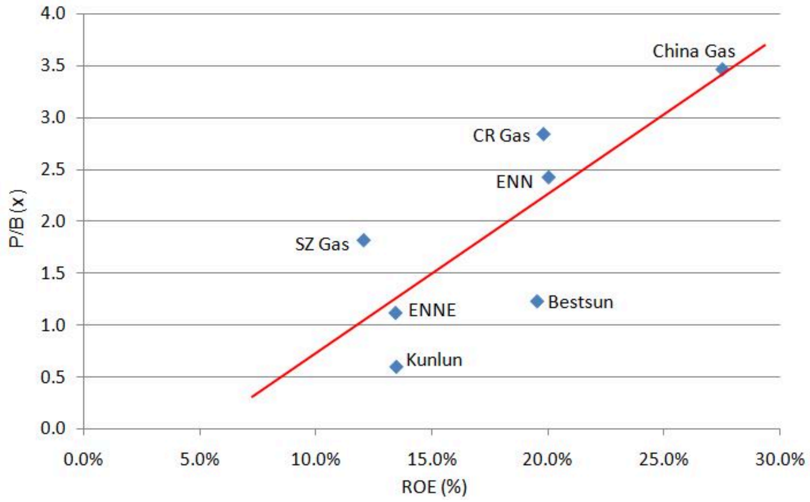
Figure 25: YTD performance of gas utilities companies vs. key market indexes



Source: astocks

On a relative valuation basis, the P/B vs ROE ratios for the gas utilities companies appear that both Kunlun and Bestsun are undervalued relative to their ROE (Figure 26). For Kunlun, we believe this is partly due to the more diversified operations and higher earnings volatility which makes the market more skeptical to pay a P/B multiple similar to the pure gas utilities companies. For Bestsun, its shorter operating history and the high exposure to connection fee are the likely reasons. As for CR Gas and SZ Gas, their P/B look high relative to ROEs, such phenomenon may be caused by the stability of their return and also their better financial position, making the market willing to pay higher premium on each unit return.

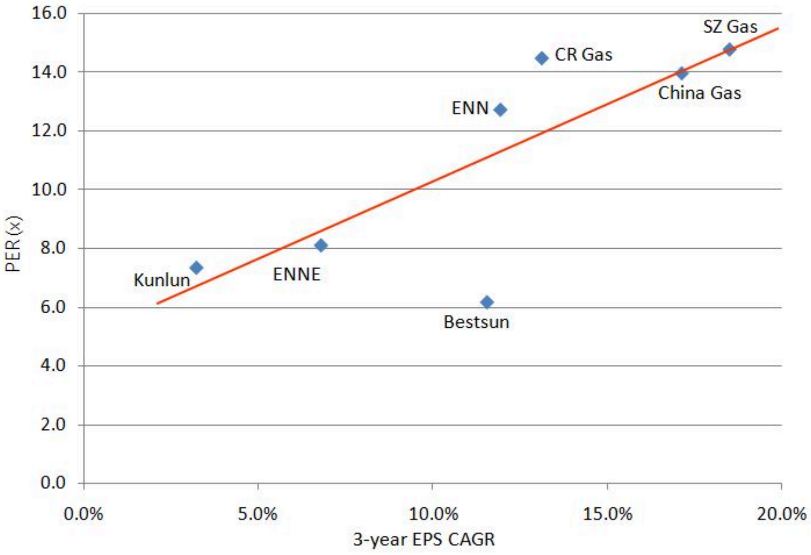
Figure 26: Relative valuation - P/B vs. ROE



Source: aastocks, Bloomberg, Eastmoney Choice database

From a P/E perspective, the valuations of most of the gas utilities companies look fair relative to their peers (Figure 27). Similar to the P/B vs. ROE ratios, Bestsun appears undervalued against their peers on the stated reasons above. However, we did observe that CR Gas looks more overvalued when compared with other peers. This is partly due to the comparatively solid performance of its share price in the last five years with its simple business mix focusing on mostly gas sales and its ability to execute growth. We also believe the support from its parent China Resources Group is also an added proposition for a premium PER valuation.

Figure 27: Relative valuation - FY20F PER vs. 3-year CAGR (2019-2022) Growth



Source: aastocks, Bloomberg, Eastmoney Choice database

ESG assessment

We are no expert in ESG assessment. However, due to the increase in importance of its role in the investment decision-making process, we have attempted to look at how these six companies (excluding ENNE as it has not completed the acquisition of ENN) fare in this regard. We draw upon the materiality map from the Sustainability Accounting Standards Board (SASB) and also the MSCI ESG Ratings as the key reference framework for our assessment.

In SASB's materiality map for Infrastructure - Gas Utilities and Distributors Industry, three General Issue Categories are identified as "Likely a material issue for companies in the industry". They are: Access & Affordability, Business Model Resilience and Critical Incident Risk Management (Figure 28).

Figure 28: SASB's "Likely a material issue for Gas Utilities and Distributors"

General Issue Category	Detailed description
Access & Affordability	The category addresses a company's ability to ensure broad access to its products and services, specifically in the context of underserved markets and/or population groups. It includes the management of issues related to universal needs, such as the accessibility and affordability of health care, financial services, utilities, education, and telecommunications.
Business Model Resilience	The category addresses an industry's capacity to manage risks and opportunities associated with incorporating social, environmental, and political transitions into long-term business model planning. This includes responsiveness to the transition to a low-carbon and climate-constrained economy, as well as growth and creation of new markets among unserved and underserved soci-economic populations. The category highlights industries in which evolving environmental and social realities may challenge companies to fundamentally adapt or may put their business models at risks.
Critical Incident Risk Management	The category addresses the company's use of management systems and scenario planning to identify, understand, and prevent or minimize the occurrence of low-probability, high-impact accidents and emergencies with significant potential environmental and social externalities. It relates to the culture of safety at a company, its relevant safety management systems and technological controls, the potential human, environmental, and social implications of such events occurring, and the long-term effects to an organization, its workers, and society should these events occur.

Source: https://materiality.sasb.org/

As for the MSCI ESG Ratings methodology, the key material issues are: Carbon Emissions, Biodiversity & Land Use, Health & Safety, Corporate Governance and Corruption & Instability (Figure 29).

Figure 29: MSCI ESG Ratings - Key material issues for Utilities

Key material issues	Detailed description
CARBON EMISSIONS	This issue evaluates whether companies may face increased costs due to carbon pricing or regulations.
BIODIVERSITY & LAND USE	This issue evaluates the potential for lost market access of litigation, liabilities, or reclamation costs from operations that damage fragile ecosystems.
HEALTH & SAFETY	This issue evaluates the potential for employee accidents that can lead to production disruptions, litigation, and liabilities.
CORPORATE GOVERNANCE	This theme evaluates the extent to which companies' corporate governance practices may pose risks to investors.
CORRUPTION & INSTABILITY	This issue evaluates the potential for regulatory risks or lost market access due to corruption scandals or political and social instability.

Source: MSCI ESG Ratings

In our discussion on the ESG consideration for individual gas utilities companies, by summing up both the SASB and MSCI issues, we regroup them back into the three broad ESG categories (Figure 30).

Figure 30: Categorising the discussion on gas utilities ESG considerations

Categories	Key issues
Environmental	Carbon emissionBusiness model resilience
Social	Heath & safetyAccessibility & affordabilityCritical incident risk management
Governance	OwnershipDiversityCorruption & instability

Source: Osbert Tang estimates

Deep dive - company discussions

We present below the six gas utilities companies (excluding ENNE as it currently does not have the downstream gas business) that we think are interesting in our order of preference. We compared and contrasted their investment opportunities and risks. In addition, we explore the details on their background, analyse revenue and margin drivers and comment on ESG considerations.

We use an unweighed scoring system (1=best, 6= worst) to rate the performance of these stocks on six attributes - opportunities, risks, ESG, financial strength, profitability and valuation. As a result, the stock with the lowest score is the most attractive one based on these criteria. They are discussed one by one based on the outcome of this ranking system (Figure 31).

Figure 31: Ranking of the gas utilities companies

Attributes	ENN Energy	CR Gas	China Gas	Kunlun	SZ Gas	Bestsun
Opportunities	1	2	3	4	5	6
Risks	2	1	3	5	4	6
ESG	1	3	2	4	5	6
Financial Strength	5	1	6	4	2	3
Profitability (Return and growth)	2	3	1	6	5	4
Valuation	3	5	6	2	4	1
Total	**14**	**15**	**21**	**25**	**25**	**26**

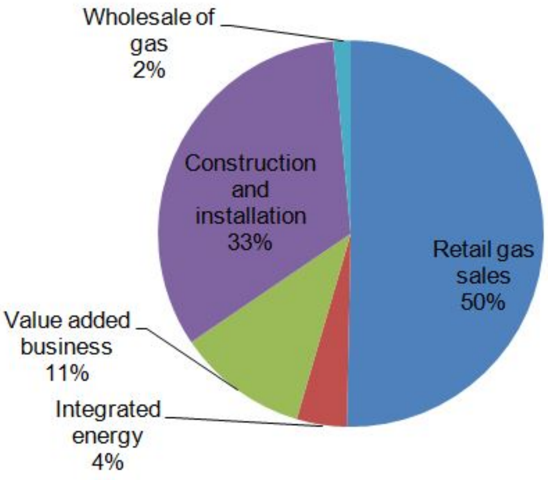
Source: Osbert Tang estimates

1. ENN Energy (2688.HK)

1.1 Background:

- ENN Energy (ENN) is one of the earliest privately-owned enterprises involved in the gas utilities business in China. Its key businesses include gas pipeline infrastructure, vehicle and ship refueling stations and integrated energy projects, sales of piped gas, LNG and other multi-energy products (Figure 32).

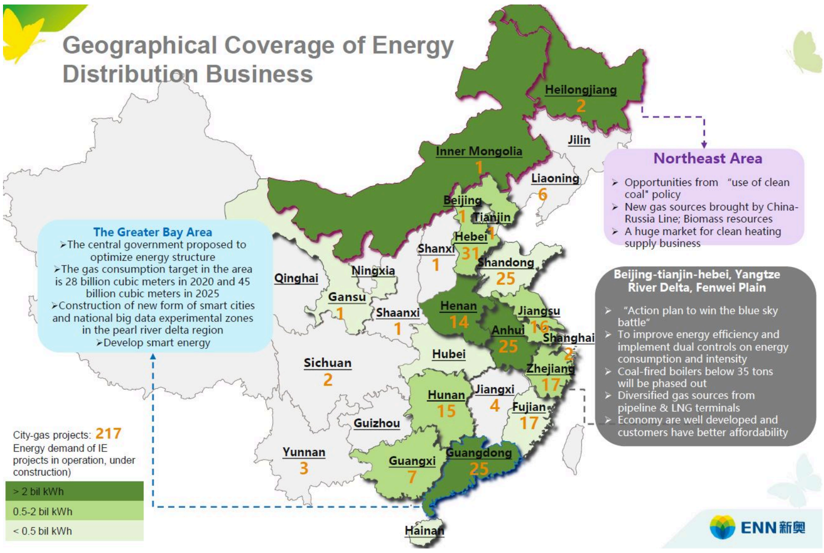
Figure 32: Breakdown of ENN Energy's profit in FY19



Source: Company data

- ENN has 217 gas sales projects in 22 provinces and municipalities in China, covering a population of 104m (Figure 33). Its natural gas sales accounted for 6.5% of China's total gas sales in 1H19, putting it amongst the largest gas utilities companies in the country.
- Another fast-growing business is integrated energy (IE), with a total of 120 projects (90 natural gas, 15 industrial waste heat, 7 biomass and 8 renewable energy and others) in operations and under construction in 27 provinces and municipalities.

Figure 33: Geographical location of ENN's projects


Geographical Coverage of Energy Distribution Business
Heilongjiang 2
Jilin
Inner Mongolia 1
Liaoning 6
Beijing 1
Tianjin 1
Hebei 31
Shanxi 1
Shandong 25
Qinghai
Ningxia
Gansu 1
Shaanxi 1
Henan 14
Jiangsu 16
Anhui 25
Shanghai 2
Hubei
Sichuan 2
Zhejiang 17
Hunan 15
Jiangxi 4
Fujian 17
Guizhou
Yunnan 3
Guangxi 7
Guangdong 25
Hainan
ENN 新奥

The Greater Bay Area

- The central government proposed to optimize energy structure
- The gas consumption target in the area is 28 billion cubic meters in 2020 and 45 billion cubic meters in 2025
- Construction of new form of smart cities and national big data experimental zones in the pearl river delta region
- Develop smart energy

Northeast Area

- Opportunities from "use of clean coal" policy
- New gas sources brought by China-Russia Line; Biomass resources
- A huge market for clean heating supply business

Beijing-tianjin-hebei, Yangtze River Delta, Fenwei Plain

- "Action plan to win the blue sky battle"
- To improve energy efficiency and implement dual controls on energy consumption and intensity
- Coal-fired boilers below 35 tons will be phased out
- Diversified gas sources from pipeline & LNG terminals
- Economy are well developed and customers have better affordability

City-gas projects: 217

Energy demand of IE projects in operation, under construction)

> 2 bil kWh
0.5-2 bil kWh
< 0.5 bil kWh

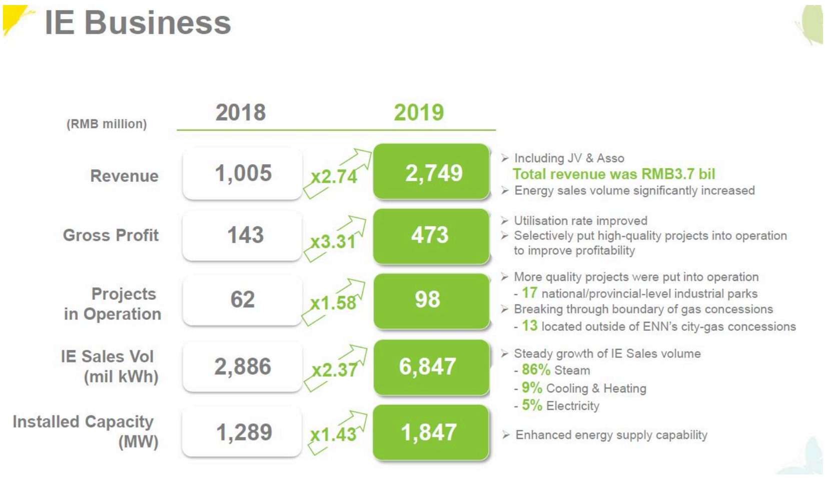
Source: Company data

1.2 Opportunities:

- **Leveraged on ENN Group to secure upstream gas supply:**
    - Its parent ENN Group has invested in its own LNG Terminal in Zhoushan. This will provide ENN easy access to upstream gas source, reducing its reliance on the Big 3.
    - With an annual capacity of 3m tons, Phase 1 of the Zhoushan LNG Terminal commenced operations in late-2018. The second phase of the Terminal is expected to entered into business in 2021 and this will increase the total capacity to 5m tons.

- Equipped with its own LNG Terminals will raise ENN's flexibility in adjusting the mix of spot and long-term contract LNG import, allowing it to better manage input costs.
    - **Leadership position set to capture the opportunities from PipeChina:**
        - With its earliest operations tracing back to 1992, ENN has one of the longest history in the sector. It has established a national presence and enjoyed the first mover advantage.
        - ENN's leadership position provides it the muscle to pursue acquisitions. The ability to reach out for quality project given its strong brandname is an added strength.
        - The formation of PipeChina is likely to give privately-owned gas utilities companies like ENN a fairer access to the pipelines. ENN's large annual retail gas volume demand of 20Bcm should provide it pricing advantage in negotiation with PipeChina in the future.
    - **IE represents new growth engine:**
        - ENN's IE business is a major growth engine. This division posted a 2.7x growth in revenue and 3.3x increase in gross profit in FY19. It is ENN Energy's fastest growing division, though it accounted for just 4% of its FY19 profit.
        - The business is positioned to capture the government's clean energy initiative and has significant synergy with its natural gas operations. Volume growth has been driven by sales of steam, cooling and heating and electricity, by using clean energy.
        - Its strategy of focusing on the development of industrial park and public infrastructure projects fit well into the government's post-outbreak stimulus measures. The IE business diversifies its business portfolio by entering high growth and non-cyclical sectors (Figure 34).

Figure 34: Performance of the IE business



IE Business

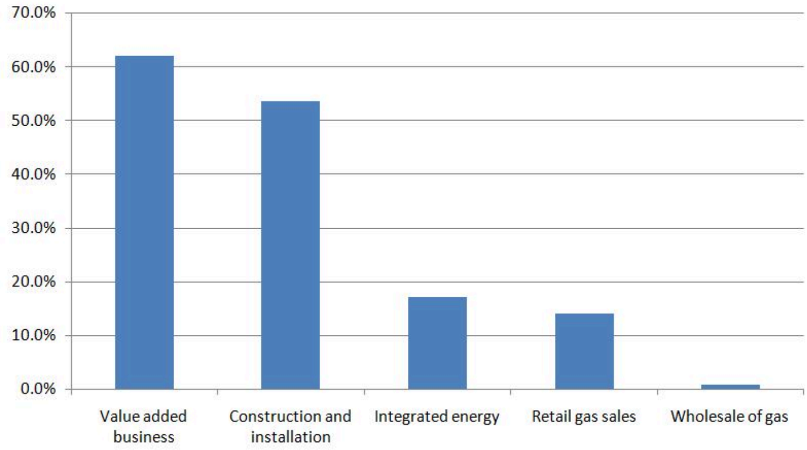
(RMB million)	2018		2019	
Revenue	1,005	x2.74	2,749	➢ Including JV & Asso Total revenue was RMB3.7 bil ➢ Energy sales volume significantly increased
Gross Profit	143	x3.31	473	➢ Utilisation rate improved ➢ Selectively put high-quality projects into operation to improve profitability
Projects in Operation	62	x1.58	98	➢ More quality projects were put into operation - 17 national/provincial-level industrial parks ➢ Breaking through boundary of gas concessions - 13 located outside of ENN's city-gas concessions
IE Sales Vol (mil kWh)	2,886	x2.37	6,847	➢ Steady growth of IE Sales volume - 86% Steam - 9% Cooling & Heating - 5% Electricity
Installed Capacity (MW)	1,289	x1.43	1,847	➢ Enhanced energy supply capability

Source: Company data

1.3 Revenue and margin drivers:

- **Acquisition to support revenue growth (+):**
    - With overall organic gas sales growth to slow, we expect ENN's guided 12-15% growth in sales volume will rely on project acquisitions. It acquired 30 new projects and 3 concessions in FY19, and they are expected to provide first full-year contribution in FY20.
    - It targets to acquire 20-30 new city gas projects in FY20. Such pace represents a slowdown from last year. Together with the Covid-19 outbreak, there will be pressure to achieve such target in this year to boost its revenue.
    - Another key revenue driver is IE business. ENN expects IE revenue to grow to Rmb6-8bn in FY20, representing a 118-191% YoY aggressive growth. If achieved, this will add some 4-7% to its FY20 revenue.
- **Value added business drive margin (+):**
    - ENN's value added business (VAB) generated a high margin of 62% in FY19, up from 45.2% a year ago, thanks to the good sales performance of its Gratle branded gas equipment and household products.
    - The penetration rate of VAB among ENN's overall customers is only 6% currently, representing strong room for growth as it step up marketing efforts - new customer penetration rate already rose to 15%.
    - Given the high margin already achieved by VAB, we expect limited room for further organic improvement. However, as VAB has the best margin in its business mix, VAB's rapid growth will continue to make positive contribution to its overall margin due to favorable change in profit mix (Figure 35).

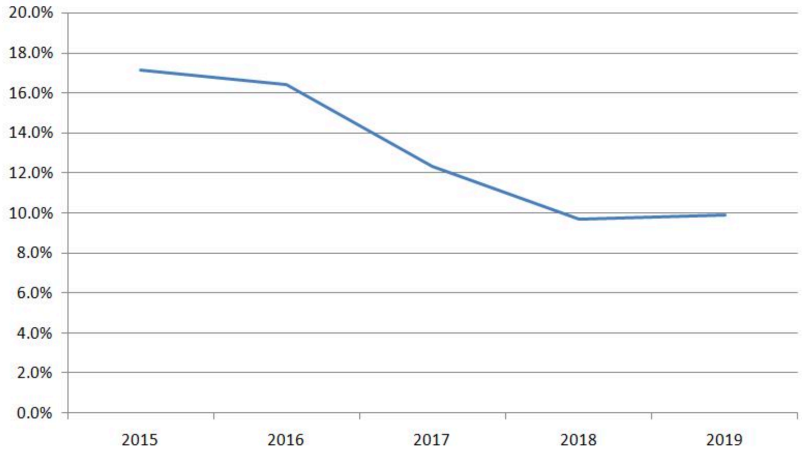
Figure 35: Margin by business segment



Source: Company data

- **Low reliance on connection fee (+):**
  - ENN has a comparatively low proportion of its overall revenue coming from connection fee, roughly around 10% of total revenue (Figure 36).
  - The low reliance suggested that it is less likely to be affected by the government's regulations of connection fees. At Rmb2,539/household for FY19, its average connection fee is not high relative to peers. This will limit the negative impact on its margin.

Figure 36: Connection fee as a percentage of total revenue



Source: Company data

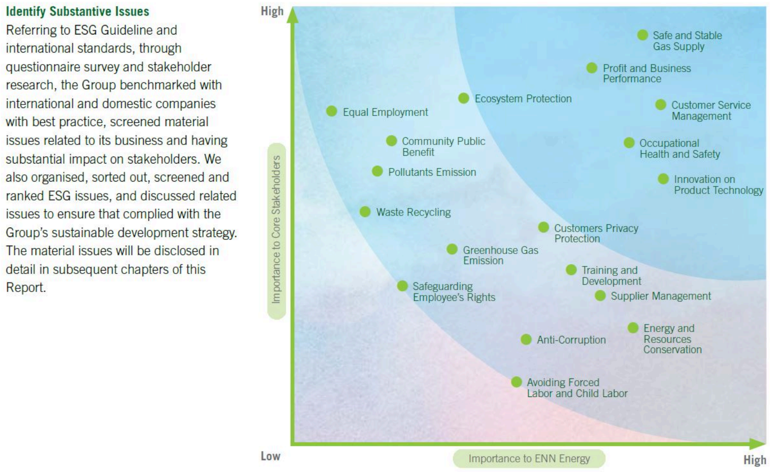
- **Margin impact from C&I customers (-):**
    - On aggregate, ENN has 77% of its gas sales are to C&I customers, the second highest among peers, and this segment is the hardest hit by the Covid-19 outbreak. This segment will also receive the concessionary tariff as guided by the government.

- The recovery of industrial segment has been on track but the commercial sector is still slow. We expect this to put pressure on its gas sales margin over the next twelve months.

1.4 ESG consideration:

- ENN's ESG report in 2018 revealed a lot of details on its ESG consciousness in the year (Figure 37). We regard its ESG performance as impressive, partly due to more diversified shareholder base to ensure governance and the high awareness of the significance of biodiversity. We would rank its ESG performance as slightly ahead of both China Gas and CR Gas.

Figure 37: Snapshot of ENN's latest (2018) ESG report



Identify Substantive Issues

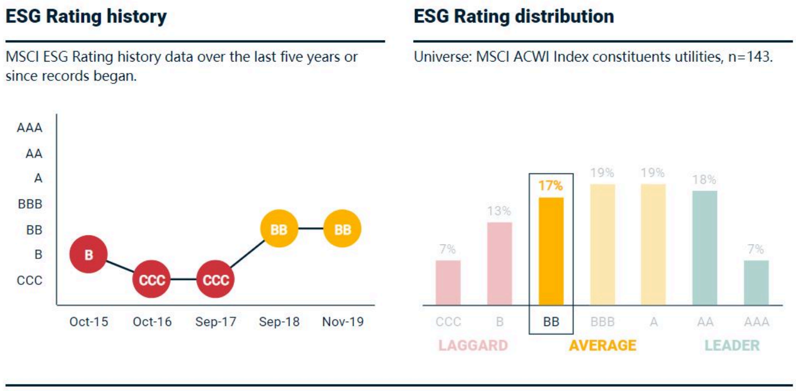
Referring to ESG Guideline and international standards, through questionnaire survey and stakeholder research, the Group benchmarked with international and domestic companies with best practice, screened material issues related to its business and having substantial impact on stakeholders. We also organised, sorted out, screened and ranked ESG issues, and discussed related issues to ensure that complied with the Group's sustainable development strategy. The material issues will be disclosed in detail in subsequent chapters of this Report.

High
Importance to Core Stakeholders
Low
Importance to ENN Energy
High
Safe and Stable Gas Supply
Profit and Business Performance
Ecosystem Protection
Equal Employment
Customer Service Management
Community Public Benefit
Occupational Health and Safety
Pollutants Emission
Innovation on Product Technology
Waste Recycling
Customers Privacy Protection
Greenhouse Gas Emission
Training and Development
Safeguarding Employee's Rights
Supplier Management
Energy and Resources Conservation
Anti-Corruption
Avoiding Forced Labor and Child Labor

Source: Company data

- **Environmental -** ENN has established ESG committees chaired by CEO and ESG Working Group, with management compensation linked with ESG metrics (operational safety, corporate governance, environmental protection and social responsibility). Measures taken to reduce greenhouse gas (GHG) emission include residual gas recovery and improvement in own energy usage efficiency. In 2018, ENN's total GHG emission was down 32.2%. Waste gas, waste water, solid waste and noise are also well under control. Its comprehensive energy consumption decreased by 32.7% and water consumption was down 18.2%. The expansion into IE is positive to environmental protection. ENN reported that IE has helped customers to improve energy efficiency. We were impressed by ENN's concern on biodiversity - it requires comprehensive soil and water conservation scheme to be formulated from the design stage of the construction. It also emphasized the replacement of galvanised tubes by new materials such as carbon steel pipe and stainless-steel pipe with less environmental pollution so as to avoid soil pollution.

- **Social -** In terms of safety management, ENN organised trainings on the visualisation system for employees in the construction and engineering department, covering 99% of its total number of projects. Total annual safety training for employees amounted to 21,816 times. ENN has showed concerns on the stable supply of gas to customers. By using the intelligent management and operation system, ENN ensured that real-time monitoring and dispatching of gas to its customers. In 2018, ENN's average customer satisfaction score reached 90.3, up 1 point from 89.3 in 2017. Also, ENN has contributed positively to the society through charity donation - a total of Rmb73m has been made in 2018.
- **Governance** - ENN's shareholding is quite diversified with the founder Wang Yusuo holding a 32.9% stake, and the rest are institutional investors including Capital Group 15.6% and Commonwealth Bank of Australia 5.65%. Its board consisted of 5 Executive Directors (EDs), 2 Non-Executive Directors (NEDs) and 4 Independent Non-Executive Directors (INEDs). However, with the pending acquisition of ENN by ENN Ecological Holdings (600803 CH) (ENNE), there is uncertainty if such diversified board composition can be maintained. Female as a percentage of total employees is at a stable 27.5%; and out of 11 senior management personnel, 4 of them are female. Anti-corruption trainings are offered to employees and in 2018, a total of 1,898 times were conducted; and ENN did not receive any significant complaints regarding corruption in 2018.
- MSCI upgraded ENN's ESG rating to BB in Sep 2018 from CCC, indicating a significant improvement in a short period of time (Figure 38). On such basis, ENN now ranked at the lower-end of the average category, and is the same rating as CR Gas and China Gas.
- ***Figure 38: MSCI ESG rating for ENN Energy***



Source: MSCI ESG Rating

1.5 Risks:

- **Slower-than-expected acquisition pace:**
    - As ENN's growth prospects rely heavily on acquisitions, a slower-than-expected pace of project acquisitions will negatively weigh on its outlook.

- The Covid-19 outbreak is likely to make acquisitions more difficult as business only start to return recently. There is risk that ENN may not achieve its target in this year.
- **Exposure to industrial sector:**
    - Its exposure to the industrial sector carries the highest risk of disappointment, in our view. China's economy has slowed down before the Covid-19 outbreak. With the likely global recession, it may lengthen the time of the recovery of demand from industrial customers.
    - Industrial park is a major driver for the IE business and this segment will also directly suffer from the weak global demand.

- **Change of immediate controlling shareholder to ENN Ecological:**
    - In Aug 2019, ENN's controlling shareholder Wang Yusuo through ENN Group International Investment Limited (EGII), proposed that EGII and its wholly-owned subsidiary Essential Investment Holding Limited to transfer their overall 32.83% stake in ENN to ENN Ecological Holdings (600803 CH) (ENNE).
    -
        - While this aims to transform ENNE into a one-stop shop of clean energy, ENNE has weaker profitability and financial position than ENN. This is potential risk that ENNE may milk ENN to pursue its own growth ambition.
        - ENNE has answered one round of questions from the CSRC and is awaiting further CSRC feedback after filing the FY19 results of both companies.
        - For brief discussion on ENNE, please see below highlight box.

1.6 Valuation and catalysts:

- ENN's share price has increased by 85% in the last five years, but retreated 13% YTD. Its 12.7x PER and 2.4x P/B are not particularly high when compared with peers.
- 2020 will mark the 20th anniversary of ENN's listing in Hong Kong. There will be possibility for announcement of special dividend.
- **Catalysts:** 1.) sustained drop in LNG input price; 2.) significant achievement in project acquisitions; 3.) better-than-expected growth in IE; and 4.) rapid recovery of C&I sales.

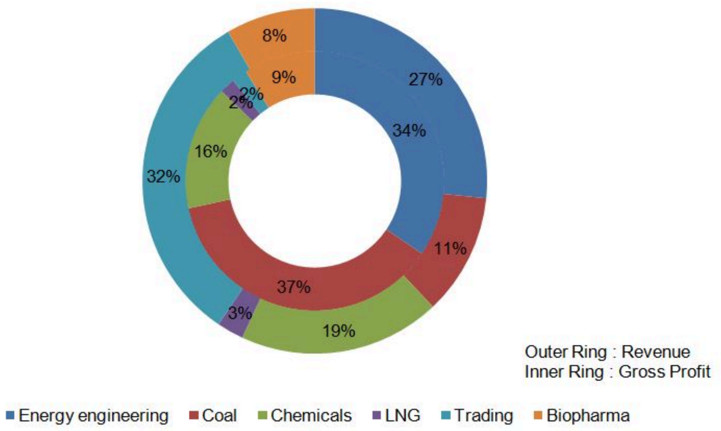
◆ ◆ ◆

A closer look on ENN Ecological (600803.CH)

Background:

- ENNE is a diversified resources company engaging in 1.) production, sales and trading of LNG, 2.) energy technology engineering, 3.) production, sales and trading of chemicals, 4.) mining, sales and trading of coal and 5.) biopharmaceutical (Figure 39).
- ENNE is 48.43%-owned by Wang Yusuo, founder of ENN. Upon the completion of the transfer of a 32.83% stake in ENN to ENNE, Wang will own 75.34% of ENNE.
- Without the acquisition of stakes in ENN, ENNE is still not yet a downstream gas utilities company.

Figure 39: Breakdown of ENNE's revenue and gross profit



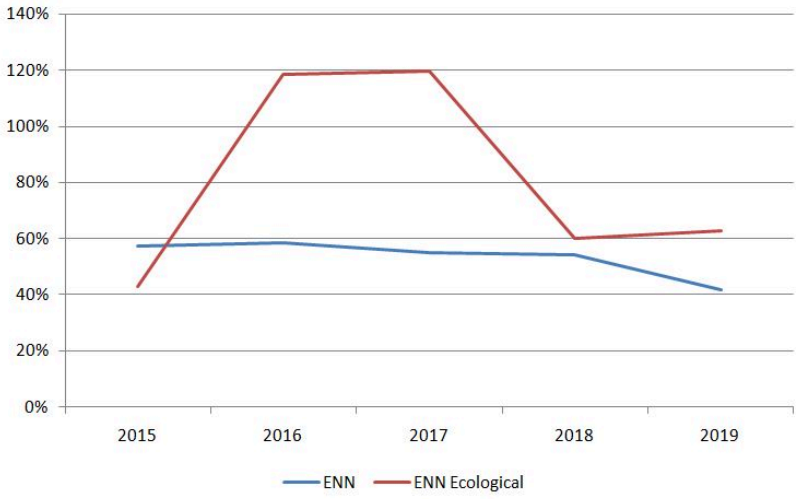
Source: Company data

Opportunities:

- If ENNE successfully acquires ENN, it will become a more comprehensive natural gas player involving both the upstream and downstream segments. It is also highly likely that it will be one of the social capitals to invest in PipeChina.

- A successful transaction will lower its gearing and improve its balance sheet as part of the consideration will be new shares issued to EGII (Figure 40). The consolidation of ENN into ENNE will also raise its earnings quality, potentially lowering its funding costs.
- We believe there is potential for ENNE to acquire the Zhoushan LNG Terminal developed and currently owned by ENN Group. This will strengthen ENNE's natural gas value chain, making it the most comprehensive natural gas player among its peers.

Figure 40: Gearing of ENN Energy and ENN Ecological

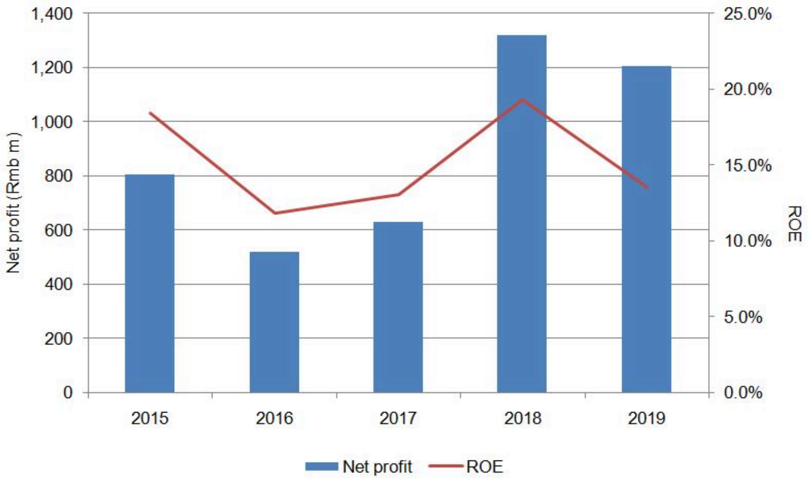


Source: Company data

Risks:

- ENNE has a leveraged financial position with FY19 gearing at 62.7%. This is a high level when compared with other gas utilities companies as well as with ENN Energy (FY19: 41.6%).
- The commodity-related business mix of ENNE has caused a fluctuation profitability and ROE over the last 5 years. Its ROE is also lower than ENN despite a higher gearing (Figure 41).

Figure 41: Historical net profit and ROE of ENNE



Source: Company data

Valuation:

- ENNE is trading on 8.1x PER, compared with ENN's 12.7x in Hong Kong. The differential reflects the weaker profit mix and commodities nature of ENNE's businesses.
- Acquisition of ENN will open a stub trade opportunity for ENNE. A 32.83% stake in ENN equals to a value of HK$27.1bn (Rmb24.8bn). Currently, with the transaction yet to complete, ENNE's own market cap is only Rmb10.4bn.

◆

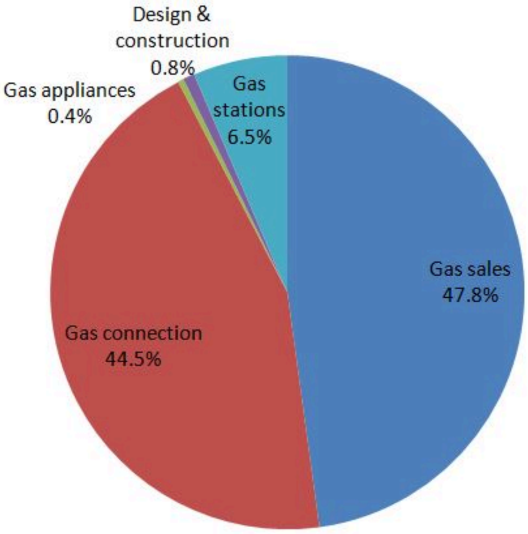
2. CR Gas (1193.HK)

2.1 Background:

- CR Gas is established in 2007 as a strategic unit of the China Resources Group (CRG), focusing on piped gas sales, vehicle gas sales and sales of gas appliances (Figure 42). It is listed in Hong Kong in 2008 and CRG holds a 63.95% stake in CR Gas.
- CR Gas has 251 gas sales projects in 22 provinces and 3 municipalities in China at end-2019 (Figure 43). It has a significant share in China's city gas sales, with total volume accounted for 9.2% of China's total gas sales in 1H19.

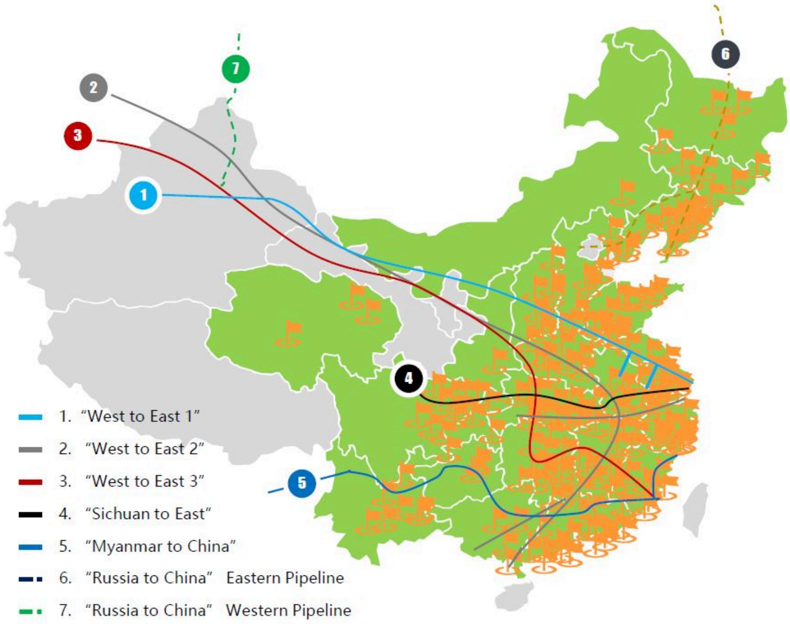
- CR Gas is the purest gas utilities companies when compared with its peers, as it does not have significant revenue and profit outside of gas utilities business. It also has significant presence in vehicle gas sales.

Figure 42: Breakdown of CR Gas' profit in FY19



Source: Company data

Figure 43: Geographical location of CR Gas' projects


1
2
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4
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6
7
1. "West to East 1"
2. "West to East 2"
3. "West to East 3"
4. "Sichuan to East"
5. "Myanmar to China"
6. "Russia to China" Eastern Pipeline
7. "Russia to China" Western Pipeline

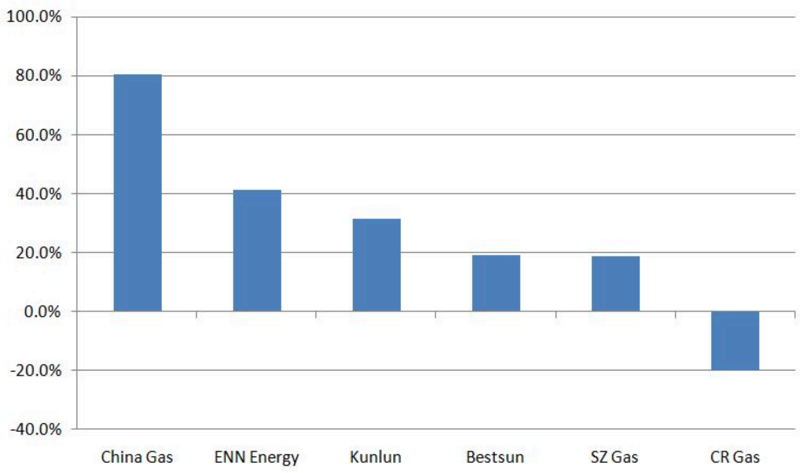
Source: Company data

2.2 Opportunities:

- **Very large player with resilience presence:**
    - Its status as one of the largest gas utilities companies will provide it the bargaining power in sourcing gas from upstream suppliers and negotiating discounted transmission tariff with PipeChina in the future.

- It strong presence in affluent cities (14 provincial capital cities and 3 municipalities) with higher profitability. Even in a net cash position, its ROE is as high as 19%. CR Gas' good track record will allow it to pick the best quality projects for acquisitions.
- Although its parent CRG does not have upstream and mid-stream oil and gas businesses, its diversified business operations, including property business, can provide excellent synergy for CR Gas to lock in new customers.
- **Strong financial position:**
    - CR Gas has the strongest financial position amongst the gas utilities companies. At end-2019, it has net cash of HK$5.4bn and is the only gas company not in a net debt position (Figure 44).
    - The comfortable financial strength means that it has the muscle to pursue acquisitions and expansion; and decision-making in acquisitions can be rapid to take hold of opportunities.
    - Its A3/A- credit rating is the highest among all gas utilities companies. This allows it to secure low funding cost, with interest expense take up just 4% of its gross profit.

Figure 44: Gearing of gas utilities companies

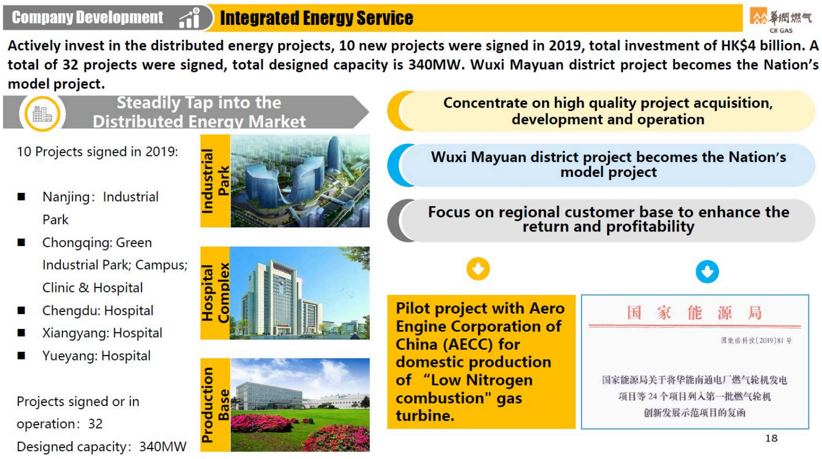


Note: Gearing = Net debt/Equity, Negative indicates net cash, based on latest financial reports. Source: Company data

- **Expansion into integrated energy businesses:**
    - With the core gas sales business entering into a steady growth phase, CR Gas can leverage its experience in clean energy to expand into new businesses like distributed energy projects.
    - CR Gas has only started to diversify into the new energy business in the last few years. Despite a late start, its experience, customer network and parent backing have supported it to capture the government's clean energy initiatives.

- In 2019, 10 new distributed energy projects were added with total investment of HK$4bn.When the outstanding projects are completed, CR Gas will have an installed capacity of 340MW (Figure 45). We expect CR Gas to have more new business projects to fuel the long term growth. However, in the next few years, its core gas sales business will still dominate its portfolio.

Figure 45: CR Gas' integrated energy business



Company Development **Integrated Energy Service**

Actively invest in the distributed energy projects, 10 new projects were signed in 2019, total investment of HK$4 billion. A total of 32 projects were signed, total designed capacity is 340MW. Wuxi Mayuan district project becomes the Nation's model project.

Steadily Tap into the Distributed Energy Market

10 Projects signed in 2019:

- Nanjing: Industrial Park
- Chongqing: Green Industrial Park; Campus; Clinic & Hospital
- Chengdu: Hospital
- Xiangyang: Hospital
- Yueyang: Hospital

Projects signed or in operation: 32

Designed capacity: 340MW

Concentrate on high quality project acquisition, development and operation

Wuxi Mayuan district project becomes the Nation's model project

Focus on regional customer base to enhance the return and profitability

Pilot project with Aero Engine Corporation of China (AECC) for domestic production of "Low Nitrogen combustion" gas turbine.

国 家 能 源 局

国能函科技〔2019〕81 号

国家能源局关于将华能南通电厂燃气轮机发电项目等 24 个项目列入第一批燃气轮机创新发展示范项目的复函

18

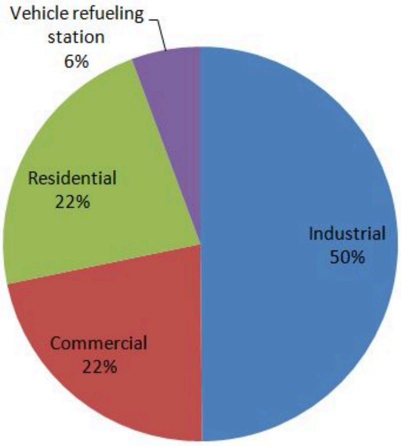
Source: Company data

2.3 Revenue and margin drivers:

- **Quality acquisitions drive revenue (+):**
    - CR Gas now needs to focus on new project acquisitions to support gas sales revenue growth. The pace of adding new projects is slower than ENN Energy - it set up 8 projects at group level and added 5 on project level in FY19, but acquisition will remain as the major revenue driver for next few years.
    - Recent signed expansions include the planned acquisition of a city gas JV in Taiyuan, Shanxi and another JV with Ningbo government and Guangxing Gas. These are quality projects and will contribute positively to revenue growth when they are rolled out.
- **Residential exposure to offset C&I margin loss (+):**

  - CR Gas has a high proportion of gas sales to residential customers at 22.6% (Figure 46). This will compensate part of the loss in revenue at the C&I sector during the Covid-19 outbreak.
  - The company's slightly lower exposure to industrial sales when compared with other Hong Kong-listed gas utilities will see its revenue and margin less affected by the weak local economy and global recession. We expect the gas sales margin for CR Gas will likely to be the most resilient in FY20 due to its customer mix.

Figure 46: CR Gas' breakdown of customer by gas sales volume



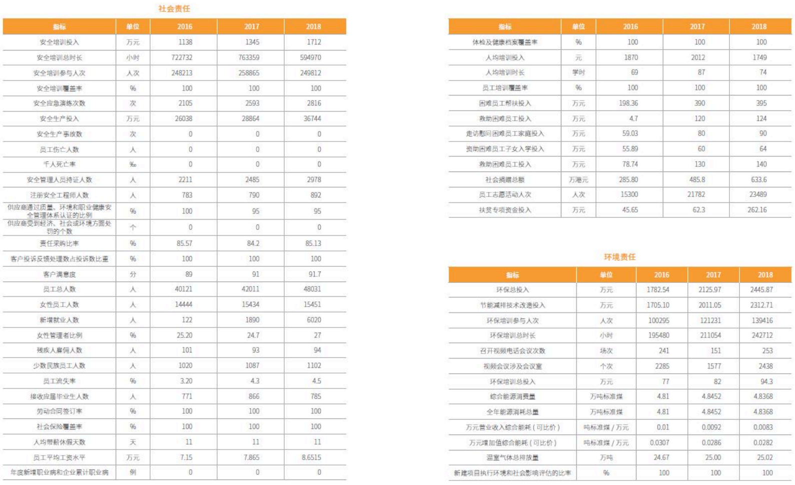
Source: Company data

- **High proportion of connection fee (-):**
  - CR Gas has a comparatively high exposure to connection fee, which accounted for 19% of its revenue. Its average connection fee has experienced a continuous drop of an aggregate of 14.2% since 2014.
  - Average connection fee was Rmb2,710 in FY19 is at the higher end of all gas utilities. This makes its revenue and margin subject to higher pressure on government's regulations of connection fee.

2.4 ESG consideration:

- By reviewing CR Gas' latest (2018) ESG report (Figure 47), we are of the view that its ESG achievement is impressive, especially as many of the issues can be quantified clearly, suggesting its high concern on ESG. We believe more efforts can be devoted to biodiversity and governance. In our view, among the three BB-rated gas utilities companies by MSCI ESG, CR Gas is marginally behind both ENN and China Gas.

Figure 47: Snapshot of CR Gas' latest (2018) ESG report



社会责任

指标	单位	2016	2017	2018
安全培训投入	万元	1138	1345	1712
安全培训总时长	小时	722732	763359	594970
安全培训参与人次	人次	248213	258865	249812
安全培训覆盖率	%	100	100	100
安全应急演练次数	次	2105	2593	2816
安全生产投入	万元	26038	28864	36744
安全生产事故数	次	0	0	0
员工伤亡人数	人	0	0	0
千人死亡率	‰	0	0	0
安全管理人员持证人数	人	2211	2485	2978
注册安全工程师人数	人	783	790	892
供应商通过质量、环境和职业健康安全管理体系认证的比例	%	100	95	95
供应商受到经济、社会或环境方面处罚的个数	个	0	0	0
责任采购比率	%	85.57	84.2	85.13
客户投诉反馈处理数占投诉数比重	%	100	100	100
客户满意度	分	89	91	91.7
员工总人数	人	40121	42011	48031
女性员工人数	人	14444	15434	15451
新增就业人数	人	122	1890	6020
女性管理者比例	%	25.20	24.7	27
残疾人雇佣人数	人	101	93	94
少数民族员工人数	人	1020	1087	1102
员工流失率	%	3.20	4.3	4.5
接收应届毕业生人数	人	771	866	785
劳动合同签订率	%	100	100	100
社会保险覆盖率	%	100	100	100
人均带薪休假天数	天	11	11	11
员工平均工资水平	万元	7.15	7.865	8.6515
年度新增职业病和企业累计职业病	例	0	0	0

指标	单位	2016	2017	2018
体检及健康档案覆盖率	%	100	100	100
人均培训投入	元	1870	2012	1749
人均培训时长	学时	69	87	74
员工培训覆盖率	%	100	100	100
困难员工帮扶投入	万元	198.36	390	395
救助困难员工投入	万元	4.7	120	124
走访慰问困难员工家庭投入	万元	59.03	80	90
资助困难员工子女入学投入	万元	55.89	60	64
救助困难员工投入	万元	78.74	130	140
社会捐赠总额	万港元	285.80	485.8	633.6
员工志愿活动人次	人次	15300	21782	23489
扶贫专项资金投入	万元	45.65	62.3	262.16

环境责任

指标	单位	2016	2017	2018
环保总投入	万元	1782.54	2125.97	2445.87
节能减排技术改造投入	万元	1705.10	2011.05	2312.71
环保培训参与人次	人次	100295	121231	139416
环保培训总时长	小时	195480	211054	242712
召开视频电话会议次数	场次	241	151	253
视频会议涉及会议室	个次	2285	1577	2438
环保培训总投入	万元	77	82	94.3
综合能源消费量	万吨标准煤	4.81	4.8452	4.8368
全年能源消耗总量	万吨标准煤	4.81	4.8452	4.8368
万元营业收入综合能耗（可比价）	吨标准煤 / 万元	0.01	0.0092	0.0083
万元增加值综合能耗（可比价）	吨标准煤 / 万元	0.0307	0.0286	0.0282
温室气体总排放量	万吨	24.67	25.00	25.02
新建项目执行环境和社会影响评估的比率	%	100	100	100

Source: Company data

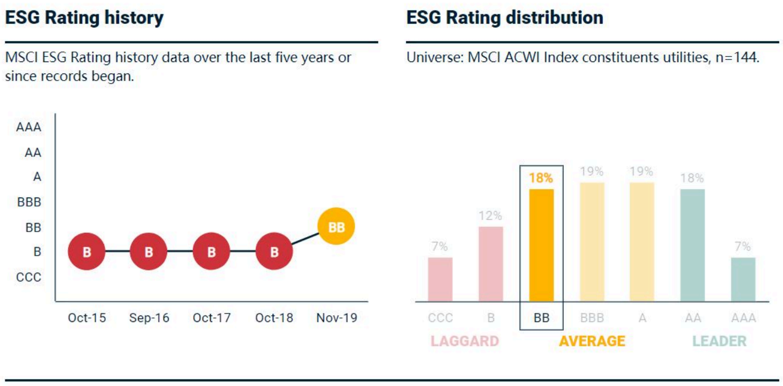
- **Environmental -** Total investment in environmental protection reached HK$56m in 2018, with HK$0.8m on reducing carbon emission. Energy consumption per HK$10,000 value added reduced by 1.4%. Its natural gas business reduced total coal usage by 29m tons and carbon dioxide emission by 28.7m tons. Environmental achievement also reflected by only 1.5% rise in power consumption, a 3.7% drop in gasoline usage and 13% drop in diesel consumption, despite a 15% increase in revenue. CR Gas also has an environmental emergency system in place to react to sudden environmental incidences.

- **Social -** CR Gas has significant investment in safety education, with a total education hours of 594,970 hours, participation by 249,812 staff-times and total investment of Rmb17.1m in 2018. No safety issues were reported in the last three years. It achieved a customer satisfaction score of 91.7 in 2018, up from 89 in 2015 and adhered to the government's pricing requirements. Potential customers have easy access to its services at a reasonable price. The company has an established complaint management system in place to cater for customer needs. In 2018, social donation amounted to HK$6.3m, up significantly from HK$2.9m and outperformed the pace of profit growth.

- **Governance -** High concentration of ownership by PetroChina with a 63.95% stake, but balanced by high board diversity with 2 EDs, 5 NEDs and 4 INEDs. However, all 7 EDs and NEDs are somehow related to CRG. In terms of gender diversity, female staff as a percentage of total staff has increased from 36% in 2015 to 38% in 2018. Anti-corruption has been a central policy of CR Gas with extensive training provided to staff. In 2018, 13 employees have been punished by the Party on violation, 11 received administrative punishment and 21 received related education.

- MSCI upgraded CR Gas' ESG rating to BB in Oct 2018 from B. This ranks CR Gas the same as ENN and China Gas and at the lower-end of the average category where 18% of the utilities companies lie (Figure 48).

Figure 48: MSCI ESG rating for CR Gas

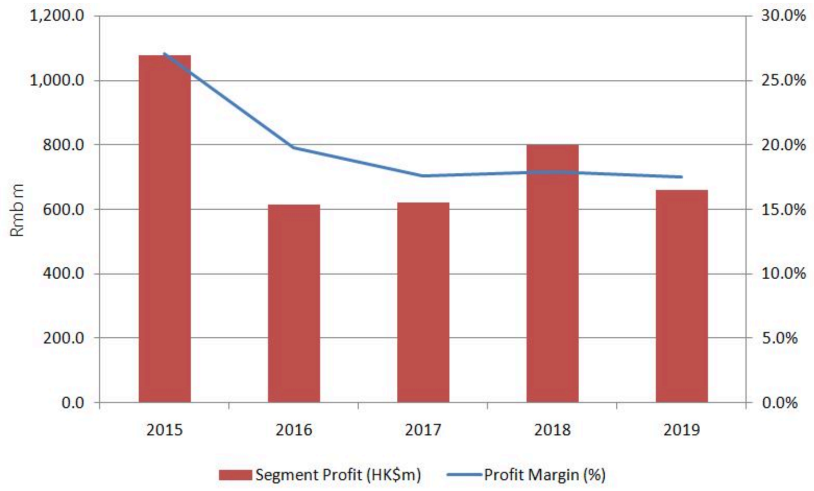


Source: MSCI ESG Rating

2.5 Risks:

- **Pressure on connection fees:**
  - As we stated above, pressure on connection fee is a major risk that may drag on CR Gas' profitability, as it derives 45% of its profit from connection fee.
  - Many governments are now restricting connection fee to Rmb2,000-2,200, this is some ~20% lower than CR Gas' FY19 average, indicating potential downside in profit from connection fee.
- **Exposure to gas station business:**
  - CR Gas has a significant exposure to vehicle gas sales. This business generated 7% of its profit but with the increase in new energy vehicles, such sales have been trending down lately.
  - Despite its expansion into charging stations, it only generated HK$40m profit in FY19 (Figure 49), which is unable to offset the HK$137m reduction in profit at its gas station business.

Figure 49: Trend of gas station profit and margin



Source: Company data

- **Lack of owned LNG facilities:**
    - Unlike ENN Group, CR Gas does not have its LNG Terminal. Its gas supply will likely to depend on upstream gas suppliers and also third-party LNG Terminals to handle its gas sourcing.

2.6 Valuation and catalysts:

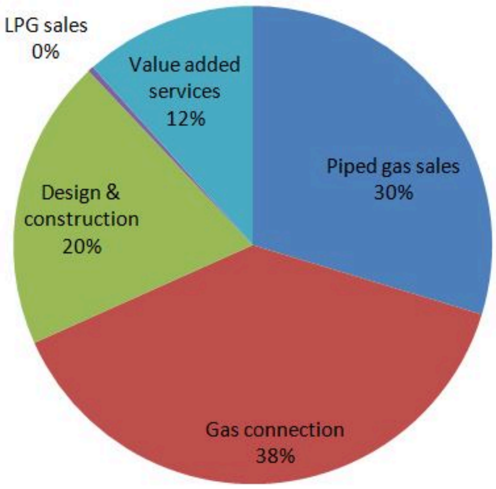
- CR Gas' share price is relatively resilient amongst the gas utilities companies. It rose 107% in the last five years and only retreated 11% YTD.
- Its 14.5x PER and 2.8x P/B are at the high end of its peers and this can be justified by its business focus on gas sales, solid financial strength and its leadership position.
- **Catalysts:** 1.) sustained drop in gas input price; 2.) significant achievements in project acquisitions and new business profit; and 3.) rapid growth in residential gas sales.

3. China Gas (384.HK)

3.1 Background:

- China Gas was established in 2002 with key businesses of piped gas sales, gas connection, design & construction, LPG sales and value added services (Figure 50). In addition, it is also the largest shareholder of the listed Zhongyu Gas Holdings (3633 HK), owning a 41.97% stake.
- The company has 582 piped gas projects and covers a population of about 160m. In 1H20, its total gas sales reached 6.8Bcm, representing 4.6% of national gas sales. This puts it as the smallest player when compared with CR Gas, ENN and Kunlun.

Figure 50: Breakdown of profit by business segment in 1H20 (FY end Mar)

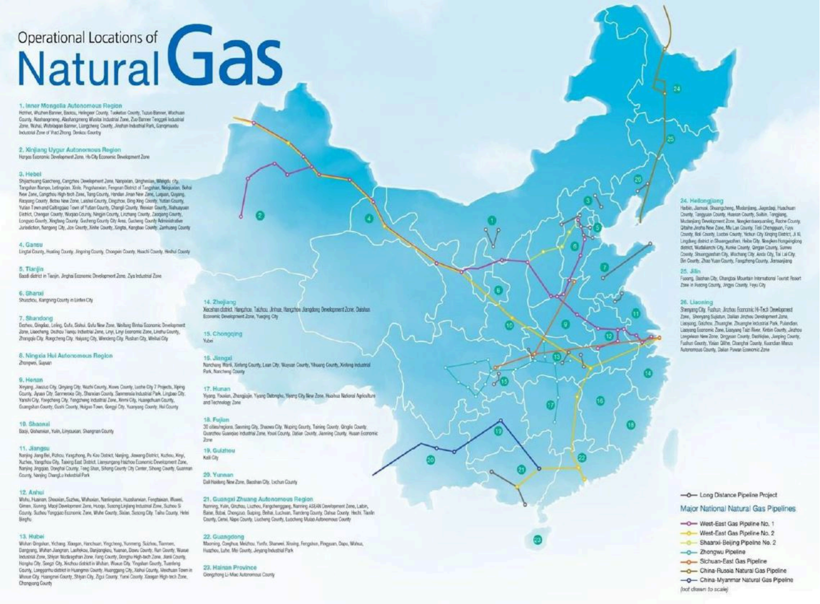


Source: Company data

3.2 Opportunities:

- **Excellent position in northeast China:**
    - China Gas is a leader in northeast China with over 120 gas projects. There are significant coal-to-gas conversion opportunities and China Gas can best capture the winter heating demand in northeast China (Figure 51).
    - With the commission of the phase 1 of the Russia-China East Pipeline in Dec-2019, China Gas will be able to achieve a secured gas supply for its customers. Previously, its growth and margin have been partly constrained by gas shortage.

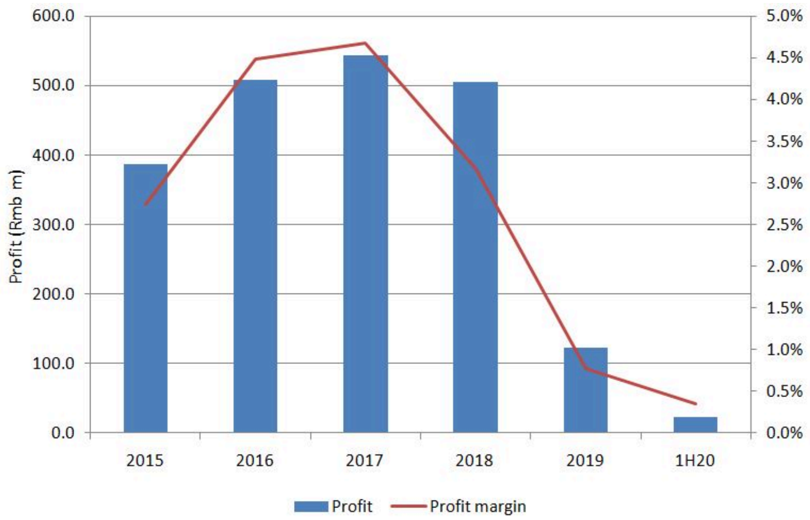
Figure 51: Geographical location of China Gas' projects


Operational Locations of
Natural Gas
1. Inner Mongolia Autonomous Region
2. Xinjiang Uygur Autonomous Region
3. Hebei
4. Gansu
5. Tianjin
6. Shanxi
7. Shandong
8. Ningxia Hui Autonomous Region
9. Henan
10. Shaanxi
11. Jiangsu
12. Anhui
13. Hubei
14. Zhejiang
15. Chongqing
16. Jiangxi
17. Hunan
18. Fujian
19. Guizhou
20. Yunnan
21. Guangxi Zhuang Autonomous Region
22. Guangdong
23. Hainan Province
24. Heilongjiang
25. Jilin
26. Liaoning
Long Distance Pipeline Project
Major National Natural Gas Pipelines
West-East Gas Pipeline No. 1
West-East Gas Pipeline No. 2
Shaanxi-Beijing Pipeline No. 2
Zhongwu Pipeline
Sichuan-East Gas Pipeline
China-Russia Natural Gas Pipeline
China-Myanmar Natural Gas Pipeline
(not drawn to scale)

Source: Company data

- **Improvement of return on assets:**
    - LPG sales business is very volatile with declining margin (from 4.5% in 2016 to 0.3% in 1H20) and takes up HK$4.3bn of its assets (Figure 52). There is room to improve the return by improving utilisation rate and procurement efficiency. We think that even an exit from the business may be an option to raise ROE.
    - Value added services (VAB) profit almost doubled in 1H20. The penetration rate of its "Gasbo" branded appliance is still low relative to its customer portfolio of 38m. Hence, there is huge room to add to VAB profit growth by increasing and optimising its marketing efforts.
    - Through granting to employees options with specific profit target (HK$14bn for any year before FY22 or HK$15bn for FY23), China Gas has put in place a quantifiable target for its employees. We see this a good incentive to improve its overall profitability and return.

Figure 52: LPG profit and margin trend



Source: Company data

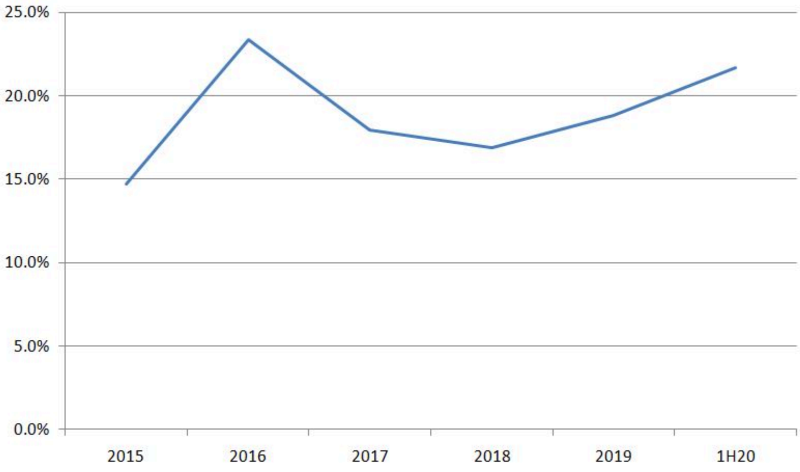
- **Capture further project growth:**
    - China Gas aims to add 10-20 new city gas concessions annually and speed up connections to old/existing residential buildings to increase penetration rate.
    - Given that it has signed up coal-to-gas conversion projects for more than 8m households with 3.24m yet to complete, there is a solid pipeline for customer expansion. Its extensive coal-to-gas experience will allow it to continue captures this conversion trend.
    - Coal-to-gas conversion for C&I customers are a big market that China Gas can capture the industrial use of gas. Moreover, connection fee for C&I customers are much higher than residential customers.

3.3 Revenue and margin drivers:

- **Coal-to-gas projects increase connected households (+):**
    - Coal-to-gas customers are expected to make a significant boost to China Gas' revenue in the next two years. Given that average gas consumption per such household for winter heating is 10x that for urban household, continued growth in these projects is a key revenue driver.
- **Value added business to drive revenue (+):**
    - VAB revenue growth reached 118.3% in 1H20 to account for 7% of the total. With a low current penetration, China Gas will boost its VAB revenue through expansion of both online and offline services and stepping up marketing efforts and sales channels.

  - We believe as its scale continues to improve, VAB margin is set to expand in the future. China Gas is expecting VAB gross profit to grow by at least 40-50% annually in FY20 and FY21.
- **Lower connection fee is a concern (-):**
  - China Gas has a higher-than-peers exposure to government's regulation on connection fee as reflected by it profit mix (Figure 53).
  - Its average connection fee has declined by 2.3% since 2014 and we believe this trend will continue on a moderate pace in the next two years. As connection fee carry a high margin of over 30%, such trend will be negative to China Gas's overall margin.

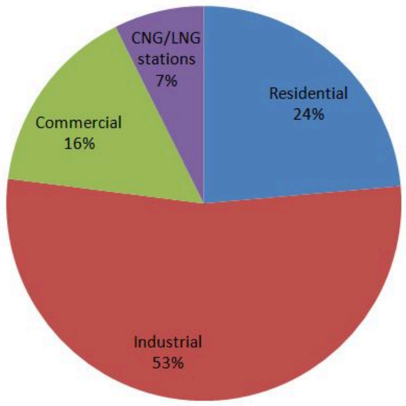
Figure 53: Connection fee as a percentage of revenue



Source: Company data

- **Industrial sector and LPG sales drag on margin (-):**
  - China Gas has a comparatively high proportion of gas sales to the industrial sector at about 53% (Figure 54). Weak demand pick up from this segment due to global economic situation and the government's concessionary tariff will weigh on their dollar margin in FY20.
  - As stated earlier, LPG margin is low and highly fluctuating. The company's difficulty in getting good control on the input cost and the high volatility are expected to cut into its overall margin.

Figure 54: Breakdown of gas sales by customer

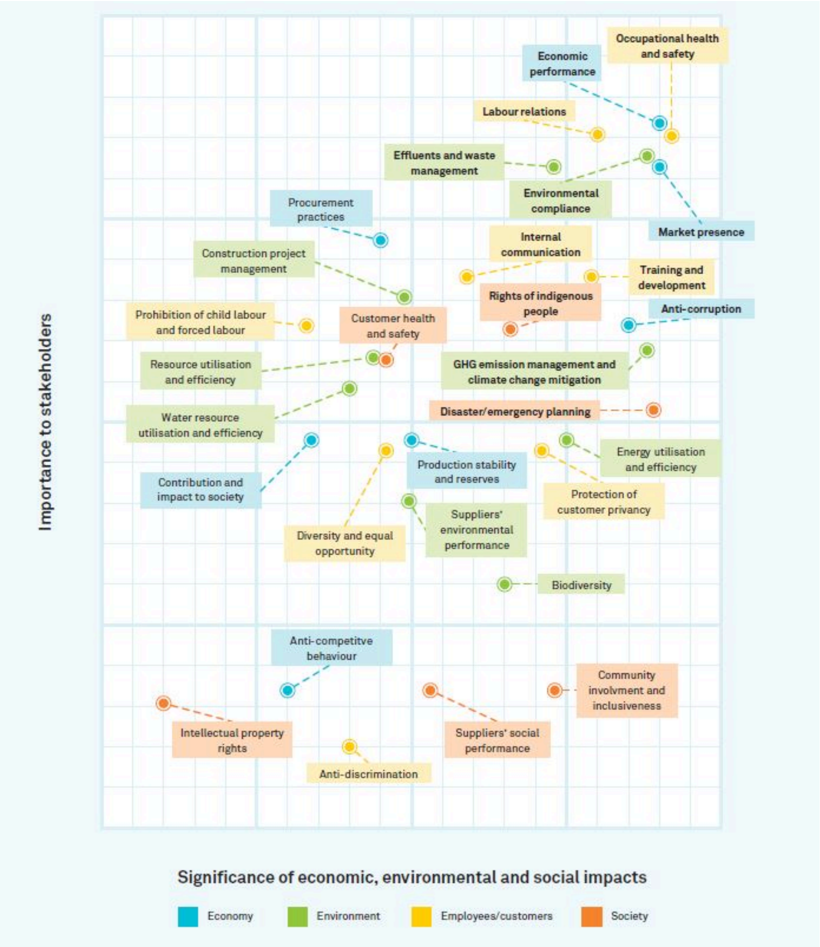


Source: Company data

3.4 ESG consideration:

- As indicated in China Gas' latest (2018-2019) sustainability report (Figure 55), China Gas has an all rounded achievement in ESG in last financial year. We like its staff diversity and inclusion and its concern about biodiversity. There is room to further improve on the social issues including healthy and safety as well as environmental performance as business expands. We view its ESG performance in the middle between ENN and CR Gas, and we think the differences among all three BB-rated companies by MSCI ESG are not very significant.

Figure 55: Snapshot of China Gas' latest (2018-2019) sustainability report



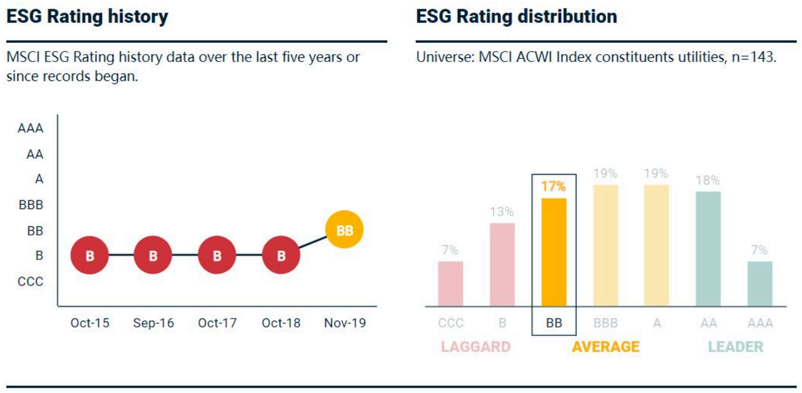
Source: Company data

- **Environmental -** Through the coal-to-gas conversion business that it engages in, China Gas has contributed to the reduction in the concentration of PM2.5, sulphur dioxide and nitrogen dioxide in Beijing. The company monitors the emission impacts from vehicle transportation, pipeline loss, non-renewable energy consumption and employee air travels. Water saving effort saw water intensity decreased by 43%. Biodiversity conservation is also highlighted, with measures including ecological environmental protection and green design. Key environmental achievement include a 5% drop in overall greenhouse gas emission, a 5% decline in non-renewable energy consumption and a 40% drop in gasoline usage. However, due to overall business expansion, total energy consumption was up by 7.5%.
- **Social** - EDs of China Gas take direct responsibilities on safety issues, and the company organised a safety production month activity in May 2018 and carried out 311 emergency drills. In FY19, it has a rate of work-related fatalities of 0.01 and 6,308 lost days to work-related injuries. In terms of accessibility to gas, China Gas has worked with companies in Henan and Shandong on gas storage facilities to ensure stable gas supply to customers in winter. China Gas specifies the

customer service protocol through the "Customer Service Management System". In FY2018/19, its on-time rate of maintenance, ignition and installation services reached over 95%. Also, China Gas was ranked as Shenzhen's Top 30 Best Employers in 2018. In 2018, social donation amounted to HK$8.5m.

- **Governance** - China Gas has a diversified shareholder base, with Beijing Enterprises Hldgs (392 HK) holding 23.7% stake, SK Holdings (034730 KS) 11.7%, Liu Minghui 20.9% and Chiu Tat Jung 18.7%. High board diversity with 4 EDs, 4 NEDs and 5 INEDs, with 3 of the board members being female. Such composition is more diversified than other gas utilities companies. China Gas' female staff amounted to 19,210 and as a percentage of total staff was 38% in 2018. In terms of anti-corruption efforts, China Gas has established three different prevention and monitoring systems. Its staffs have undergone total training of 123,545 hours.
- MSCI upgraded China Gas' ESG rating to BB in Oct 2018 from B, a level similar to CR Gas and ENN. This also ranks China Gas at the lower-end of the average category (Figure 56).

Figure 56: MSCI ESG rating for China Gas

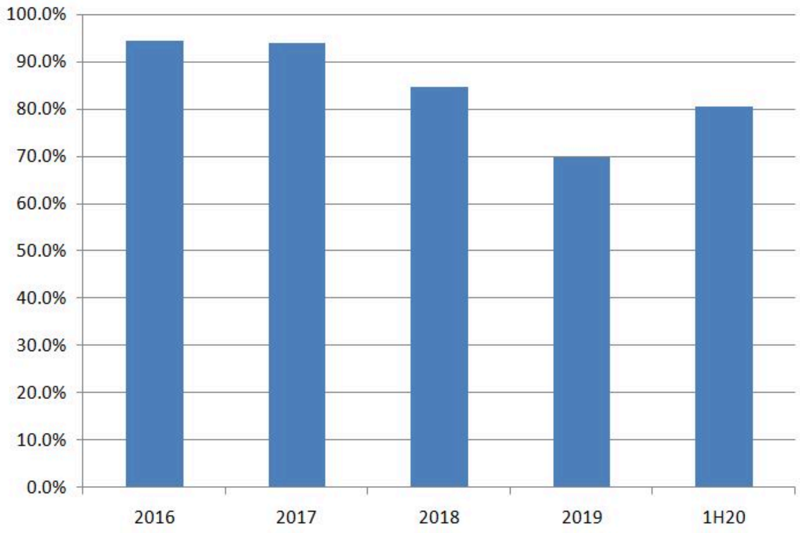


Source: MSCI ESG Rating

3.5 Risks:

- **High gearing with load of short-term debt:**
    - China Gas' gearing of 80.7% is the highest among all gas utilities, and this elevates its interest expenses and also is a potential risk of high cost of refinancing (Figure 57).
    - Short-term debt amounted to HK$16.9bn, or 44% of its outstanding debt, with cash on hand amounting to HK$9.6bn at end-Sep 2019.

Figure 57: Gearing trend of China Gas



Source: Company data

- **Reliance on connection fees:**
    - China Gas' reliance on connection fee in its profit mix is a major risk for the company. Although this is partly due to the higher connection fee from the coal-to-gas conversion projects, we believe the trend of lower connection fee will put sustained pressure on profitability.
    - Gas connection accounted for 38% of its profit, higher than 30% for its piped gas sales; we think this is not a healthy mix. An Rmb100 drop in average connection fee is estimated to erode about 4% of its profit.
- **Challenge on refilling stations:**
    - China Gas' CNG/LNG refilling stations are facing challenges from the government's policy to promote electric vehicles. Total number of CNG/LNG stations has come down from 580 in 1H19 to 555 in 1H20.

3.6 Valuation and catalysts:

- China Gas' share price has increased by 133% in the last five years, but retreated 9% YTD. Supported by debt-driven earnings growth, it is the best performing Hong Kong-listed gas utilities company on a five year horizon. Consensus forecasts expect China Gas to have an average EPS growth of 17.6% annually in FY20 and FY21, the second highest in the sector behind Shenzhen Gas Corp Ltd A (601139 CH).
- Its high ROE of 27.5% is the key reason behind its highest P/B of 3.5x in the sector. However, this is mostly achieved through a high leverage. We cannot rule out the possibility of a cash call.

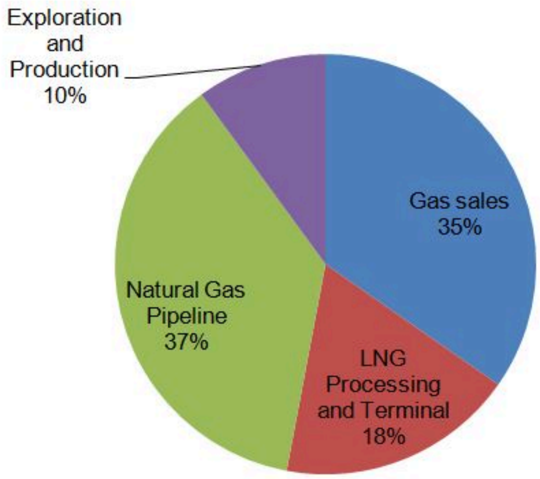
- **Catalysts:** 1.) sustained drop in gas input price; 2.) further increase in coal-to-gas conversion project expansion; and 3.) profitability improvement at LPG business.

4. Kunlun Energy (135.HK)

4.1 Background:

- Kunlun Energy has a more diversified business mix than other gas utilities companies. It derives 82% of its revenue and 35% of its profit from downstream gas sales business in FY19. The other businesses are upstream exploration and production (E&P) and mid-stream natural gas pipeline. Kunlun also owns 3 LNG Terminals and 14 LNG processing plants (Figure 58).

Figure 58: Breakdown of Kunlun's profit in FY19



Source: Company data

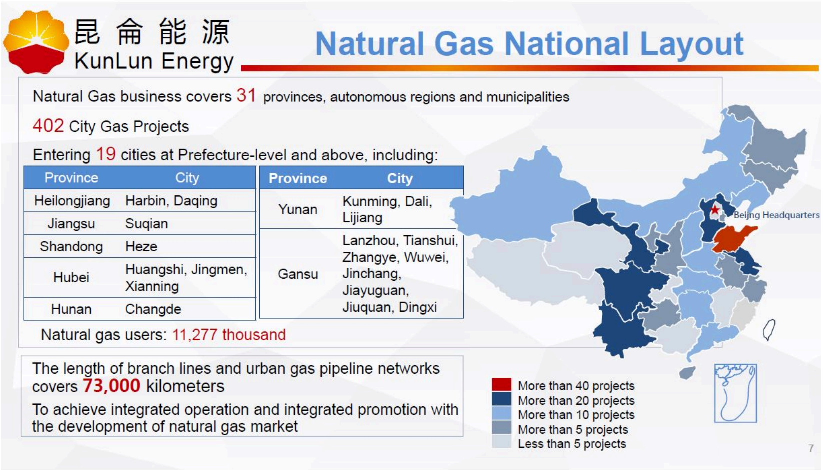
- Petrochina Co Ltd H (857 HK) is its largest shareholder with a 58.3% stake. Supported by this powerful parent, Kunlun has expanded into the downstream gas sales business in 2016 through the acquisition of Kunlun Gas.
- Kunlun has a strategic position in CNPC Group as its major platform for the development of natural gas business. In 1H19, total city gas sales of Kunlun amounted to 9Bcm, accounting for 6% of China's total natural gas consumption.

4.2 Opportunities:

- **Leverage on PetroChina in downstream gas sales:**

  - Kunlun entered the downstream gas business in 2016 and it is streamlining the PetroChina's original operations. At end-2019, Kunlun has 402 city gas projects but there are only 6 provinces that it has more than 20 gas projects (Figure 59).
  - PetroChina's strong marketing network and LNG terminals are added advantages to allow Kunlun to pursue its expansion. The acquisition of 17 gas supply and management companies from Petrochina Jinhong Energy A (000669 CH) in Oct 2019 for a total of RMB1.66bn will provide a first time full-year contribution in FY20.
  - In the near term, before the completion of PipeChina's consolidation, Kunlun will continue to benefit from PetroChina's secured gas supply and the latter's significant ownership in China's cross-province pipelines to support its further development in the downstream business.

Figure 59: Geographical locations of Kunlun's projects



昆 侖 能 源
KunLun Energy

Natural Gas National Layout

Natural Gas business covers 31 provinces, autonomous regions and municipalities

402 City Gas Projects

Entering 19 cities at Prefecture-level and above, including:

Province	City
Heilongjiang	Harbin, Daqing
Jiangsu	Suqian
Shandong	Heze
Hubei	Huangshi, Jingmen, Xianning
Hunan	Changde

Province	City
Yunan	Kunming, Dali, Lijiang
Gansu	Lanzhou, Tianshui, Zhangye, Wuwei, Jinchang, Jiayuguan, Jiuquan, Dingxi

Natural gas users: 11,277 thousand

The length of branch lines and urban gas pipeline networks covers **73,000** kilometers

To achieve integrated operation and integrated promotion with the development of natural gas market

Source: Company data

- **Disposal of upstream E&P business:**
  - Kunlun plans to dispose of its upstream E&P business to focus on the downstream business. Kunlun has already terminated its gas projects in Xinjiang and we see this a major step to move in the direction of strategic re-positioning.
  - The upstream business has always added to Kunlun's earnings volatility and the collapse in the share price YTD is primarily driven by this burden. Given the depressed oil price in 2020, we believe these assets to be loss-making in FY20. We expect this to intensify its need to get rid of the E&P business and once confirmed, it will be a positive share price catalyst.

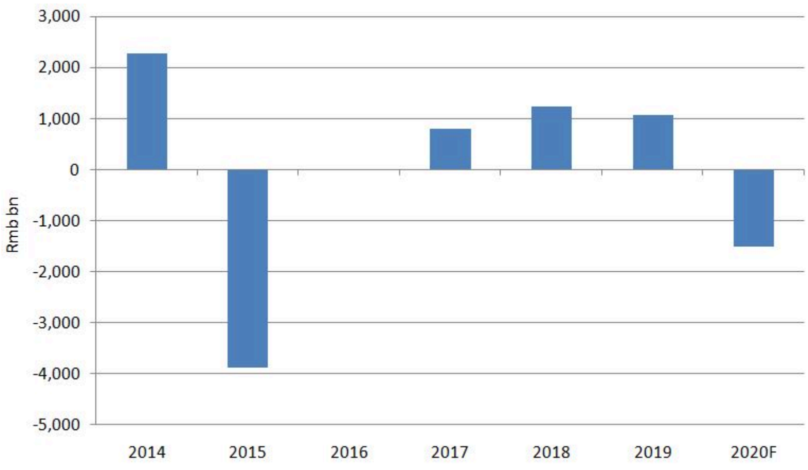
- **Restructuring of pipeline asset:**
  - With the formation of PipeChina, Kunlun is expected to exchange its pipeline asset for a combination of a minority stake in PipeChina and possibly cash consideration. On 10 Dec 2019, Kunlun has announced that it has commenced such negotiation with PipeChina.

- The transaction will be negative to Kunlun's earnings in the near term but will also remove the related capex from Kunlun. The pipeline segment has a total asset value of Rmb43bn. A disposal will realise such asset value, potentially partly in cash, for it to invest in downstream business.

4.3 Revenue and margin drivers:

- **Near term driven by oil price (-):**
  - Kunlun's E&P business only accounted for 2% of its assets. However, it will be an important driver (negative) for its FY20 margin, though the revenue impact will be milder. In FY19, at a realised ASP of US$54.5/bbl, the segment's profit margin is at 54.4%.
  - If the oil price to stay at US$25/bbl for the rest of 2020, we estimate this will erode Kunlun's bottom line significantly, with a potential loss of at least Rmb1.5bn to be incurred in FY20 (Figure 60).

Figure 60: Profit performance of Kunlun's E&P business

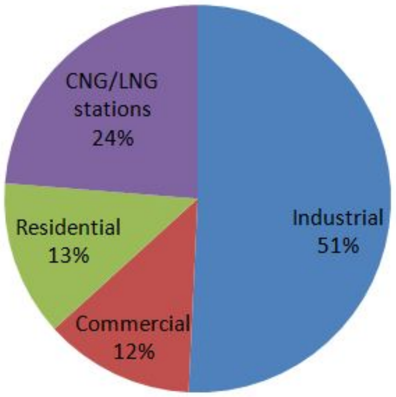


Source: Company data

- **Integration of Jinhong (+):**
  - The first full-year contribution from the Jinhong acquisition will drive Kunlun's downstream gas utilities earnings in FY20. Jinhong is the first major downstream acquisition made by Kunlun in the last two years.

  - We believe Jinhong will bring slight margin improvement for Kunlun, given the potential cost synergy with its existing downstream operations. Jinhong's operations are expected to complement well with Kunlun's existing operations.
- **Exposure to industrial sector (-):**
  - Compared with other gas utilities companies, Kunlun has a higher exposure to industrial sector at 51% of volume. Residential gas sales only accounted for 13% of its total by volume (Figure 61).
  - We believe along with commercial customers, gas sales to industrial sector will be more negatively affected by the Covid-19 outbreak - both in terms of volume and the concessionary pricing encouraged by the government.
  - This exposure is expected to be a drag on FY20 revenue and margin, and we expect a lower input price will only slightly mitigate the negative impact on Kunlun's bottom line.

Figure 61: Kunlun's breakdown of gas sales by sector

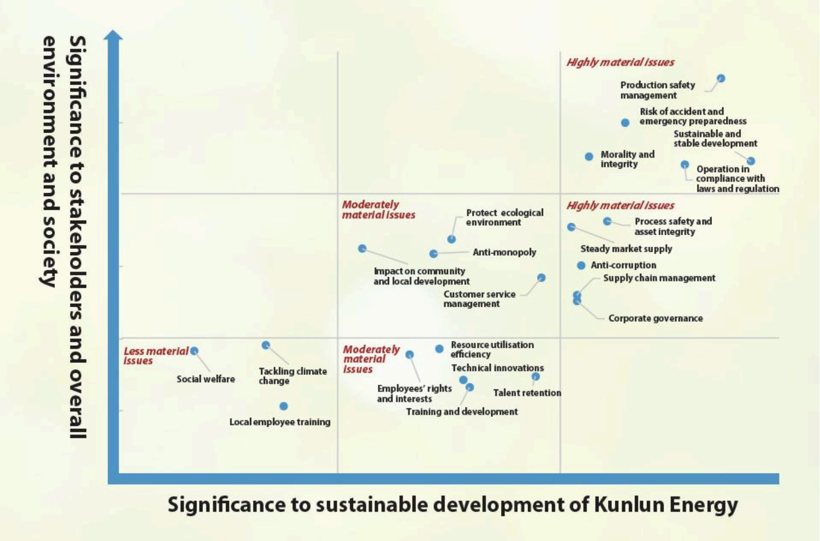


Source: Company data

4.4 ESG consideration:

- After reviewing Kunlun's latest (2018) ESG report (Figure 62), we consider its ESG performance not particularly impressive, especially in the area of governance, with PetroChina dominating the EDs in the board. There are also limited issues that Kunlun has provided significant, particularly quantifiable, evidences to support its ESG achievement. We agree that when compared with the other three Hong Kong-listed gas utilities in this Smartkarma Original, it is ranked the lowest.

Figure 62: Snapshot of Kunlun's latest (2018) ESG report

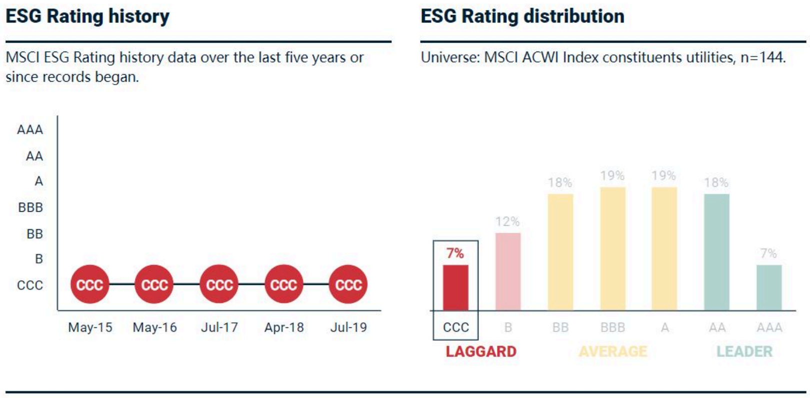


Source: Company data

- **Environmental -** A quality, healthy, safety and environment (QHSE) committee was established by Kunlun to lead its environmental protection initiative. The company managed the discharge of waste water, solid waste and waste gas. In 2018, it recycled 45.5m cu.ft. of methane and recovered 49.7m cu.ft. of oil field associated gas. Electricity consumption was up 3.5% in 2018, but overall energy consumption has reduced by 3.4% in 2018. Water consumption, however, increased 7.4%. Throughout 2018, total indirect carbon dioxide emission was reduced by 47.6m tonnes.
- **Social -** Kunlun's QHSE committee is also responsible for its production safety work. A total of 285 safety knowledge lectures were conducted. In 2018, total investment of Rmb34m was made in safety and environmental issues, and it conducted a total of 860 emergency drills. We see Kunlun performing well in maintaining accessibility of services to customers; particularly that it has highlighted the importance and its plan to ensure the market supply of natural gas during winter, including the use of production and storage capacity during slack seasons to ensure availability. Lastly, in 2018, Kunlun achieved a 99% customer satisfaction level, which is 4% higher than the pre-determined satisfaction objective.
    - **Governance -** Kunlun's shareholding is highly concentrated with the CNPC Group, either directly or indirectly through PetroChina, owns 61.7% interest. We consider its board as not diversified enough with 5 EDs and 5 INEDs, and all EDs are related to PetroChina. No information is released on gender diversity of its total employees, but there is no female director in the board. Kunlun has established an anti-corruption mechanism and has approximately 150 employees in total (full or part-time) engaging discipline inspection and supervision work. No major incidents in violation of laws and regulations relating to bribery, extortion, fraud or money laundering were reported during in 2018, but no detailed statistics are available in the ESG report.

- MSCI has consistently rated Kunlun Energy's ESG score at CCC since May-2015. This put it at the bottom most 7% against its peers in the sector (Figure 63).

Figure 63: MSCI ESG rating for Kunlun Energy



Source: MSCI ESG Rating

4.5 Risks:

- **Persistent low oil price and inability to dispose of upstream business:**
    - A persistent low oil price will be the major risk of Kunlun, leading to significant E&P loss.
    - Kunlun has already publicised its intention to dispose of the upstream business. We see an inability to confirm a plan or transaction a downside risk.
- **Removal of pipeline assets:**
    - The removal of pipeline assets will erode its profit in the medium term should it be unable to compensate by a corresponding increase in downstream profit or asset injection from PetroChina.
    - A complete disposal of its pipelines will remove Rmb2.5bn of profit from Kunlun. Since Kunlun will likely to get back a minority stake in PipeChina, it will not be able to equity accounted such interest, resulting in a low dividend income annually from PipeChina.
- **PipeChina formation weakens its vested interest:**
    - With PetroChina losing the complete ownership in its pipeline assets to PipeChina, Kunlun's vested competitive advantage is removed. Previously PetroChina, with its dominant pipeline ownership, helps Kunlun to maintain a more secured gas supply.
    - The transfer of pipeline to PipeChina also means that its existing access to gas transmission may potentially weaken. This will not only affect its ability to roll out new projects but also mean paying a potentially higher tariff for transmission through PipeChina.

4.6 Valuation and catalysts:

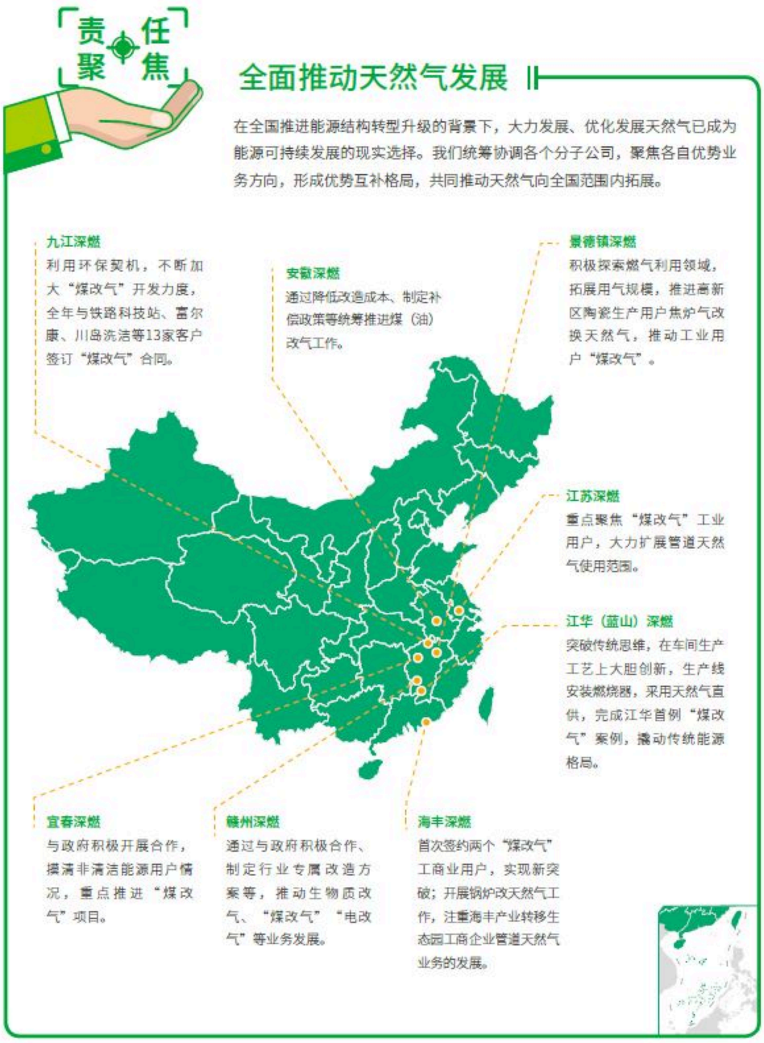
- Kunlun is the cheapest gas utilities stock in the Hong Kong market, primarily due to its more diversified business mix. Its exposure to fluctuation of oil price and uncertainties on the injection of pipeline assets into PipeChina are the other factors that dragged on its valuation.
- At 0.6x P/B for FY20, Kunlun's current valuation is already close to the lowest level in the last five years, and this renders the stock inexpensive in historical context.
- **Catalysts:** 1.) sustained recovery in oil price; 2.) announcement of disposals of upstream business; 3.) favorable price (above ~1.3x P/B, in our view) for the injection of pipeline assets to PipeChina; and 4.) significant acquisitions of downstream gas projects.

5. Shenzhen Gas (601139.CH)

5.1 Background:

- Shenzhen Gas (SZ Gas) is a State-owned enterprise (SOE) 50.1%-controlled by the Shenzhen State-owned Assets Supervision and Administration Committee (SASAC). The company has introduced notable private enterprises as its significant shareholders - Hong Kong & China Gas (3 HK) holds an aggregate of 26.5% interest and New Hope Group holds 6.8%.
- Besides Shenzhen, it has presence in piped gas business in 38 cities in eight provinces (Figure 64). Its other businesses are wholesale and retail of LPG, construction and installation, and wholesale of LNG. SZ Gas also derives significant revenue from gas sales to power stations (Figure 65).

Figure 64: Geographical locations of SZ Gas' projects



责任聚焦

全面推动天然气发展

在全国推进能源结构转型升级的背景下，大力发展、优化发展天然气已成为能源可持续发展的现实选择。我们统筹协调各个分子公司，聚焦各自优势业务方向，形成优势互补格局，共同推动天然气向全国范围内拓展。

九江深燃

利用环保契机，不断加大“煤改气”开发力度，全年与铁路科技站、富尔康、川岛洗洁等13家客户签订“煤改气”合同。

安徽深燃

通过降低改造成本、制定补偿政策等统筹推进煤（油）改气工作。

景德镇深燃

积极探索燃气利用领域，拓展用气规模，推进高新区陶瓷生产用户焦炉气改换天然气，推动工业用户“煤改气”。

江苏深燃

重点聚焦“煤改气”工业用户，大力扩展管道天然气使用范围。

江华（蓝山）深燃

突破传统思维，在车间生产工艺上大胆创新，生产线安装燃烧器，采用天然气直供，完成江华首例“煤改气”案例，撬动传统能源格局。

宜春深燃

与政府积极开展合作，摸清非清洁能源用户情况，重点推进“煤改气”项目。

赣州深燃

通过与政府积极合作、制定行业专属改造方案等，推动生物质改气、“煤改气”“电改气”等业务发展。

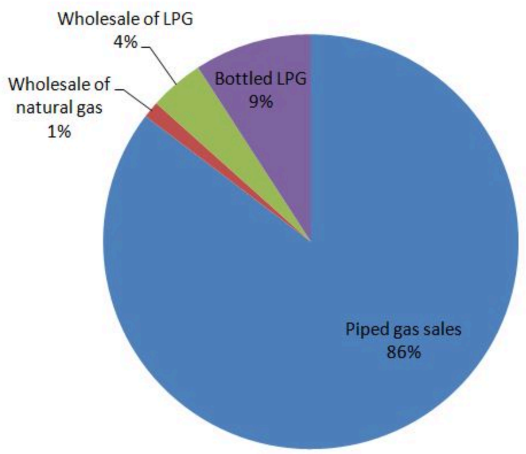
海丰深燃

首次签约两个“煤改气”工商业用户，实现新突破；开展锅炉改天然气工作，注重海丰产业转移生态园工商企业管道天然气业务的发展。

Source: Company data

- SZ Gas is the second largest A-share gas utilities company with a market share of 1%. It is about 25% smaller than the largest A-share peer Chongqing Gas Group Corp (600917 CH), measured by volume of gas sales.

Figure 65: Breakdown of profit in FY18

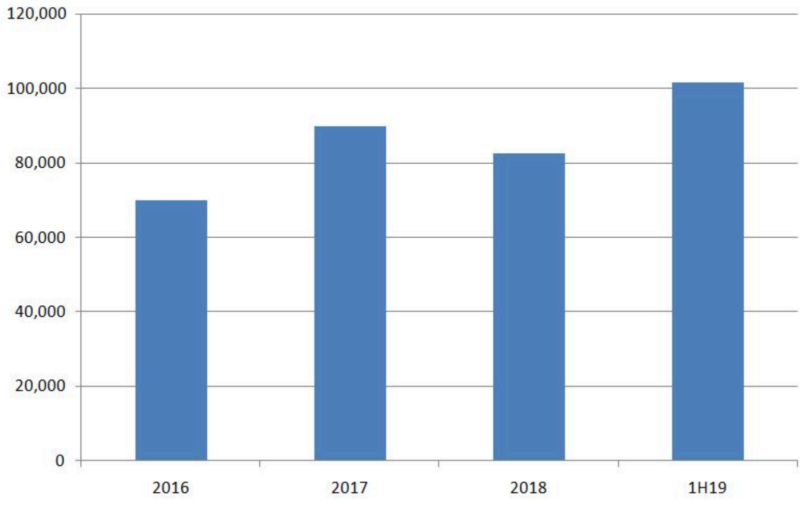


Source: Company data

5.2 Opportunities:

- **Low penetration in Shenzhen drives outlook:**
    - As the penetration of natural gas in Shenzhen households is only at ~50%, lower than over 70% for other Tier-1 cities like Beijing and Shanghai, there is significant room for SZ Gas to grow its residential customer portfolio.
    - The upgrade of old quarters to use natural gas in Shenzhen under the government's "Village within city" management plan provides SZ Gas the expansion opportunities. It added an average of 80,000 households annually in the last 3 years and this plan is expected to last until 2025 (Figure 66).

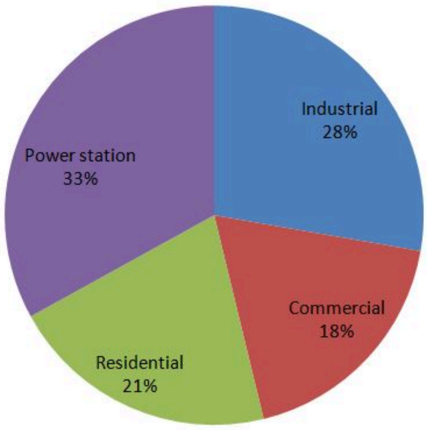
Figure 66: Annual addition household under "Village within city" management plan



Source: Company data

- **Supply of natural gas to power station:**
    - Unlike other gas utilities peers, SZ Gas has significant direct sales to power stations, roughly accounting for 33% of its total gas sales volume (Figure 67). Over the next two years, Shenzhen will build an estimated 2,400MW of gas-fired power plants and these are clear opportunities for SZ Gas.
    - SZ Gas has a stake in the Guangdong LNG Terminal through its 10% ownership in Guangdong Dapeng. It has also commenced the operations of a 1Bcm LNG storage in Aug 2019. These projects will assure its stable supply of natural gas to end-users.

Figure 67: Breakdown of gas sales by segment



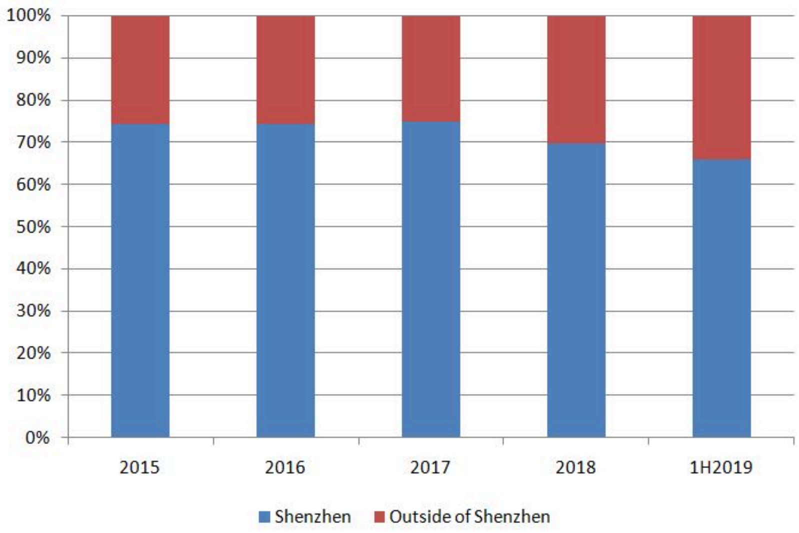
Source: Company data, Osbert Tang estimate

- **Unique shareholder mix is an advantage:**
    - The blend of a SOE, a leading Hong Kong gas company and a prominent Chinese private enterprise as shareholders gives SZ Gas the unique advantages of the connection of the SASAC, the management quality of HK&CG and the flexibility of Chinese private enterprise.
    - SZ Gas has a gearing of 19%, which is low when compared with its peers. This will allow it to capitalise on the strengths of HK&CG and New Hope Group to capture the opportunities to acquire new city gas projects outside of Shenzhen.

5.3 Revenue and margin drivers:

- **Huge acquisition room to boost revenue (+):**
    - SZ Gas has a short history of expanding outside of Shenzhen; however, it has already secured close to 40 city gas projects, with piped gas sales outside of Shenzhen now accounted for 34% of total (Figure 68).
    - With the ramp up of these projects, we see revenue growth to accelerate over the next two years, partly due to the low base when compared with its peers.

Figure 68: Breakdown of revenue by geography



Source: Company data

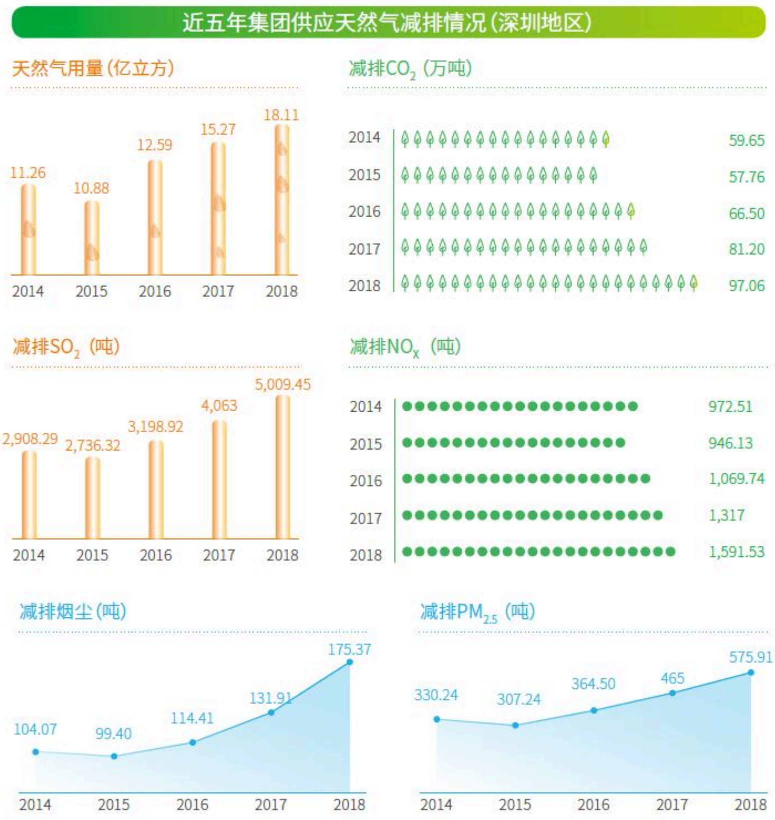
- **Ability to manage input cost positive for margin (+):**
    - Equipped with LNG Terminal and the newly commissioned LNG storage facilities, SZ Gas has the hardware to manage the mix and inventory of its gas input. This will provide more flexibility to control its cost and is expected to be positive to its margin.

  - **Minimal exposure to connection fees (+):**
    - Within the sector, SZ Gas is the least exposed to the government's regulations on connection fees - this is because it does not charge connection fees in Shenzhen.
  - Instead, SZ Gas enjoys a high dollar margin than its peers by shifting part of the connection fee to gas tariffs. As such, we do not expect any pressure to lower its connection fees.
- **Lower margin from sales to power plant (-):**
  - Given the large scale of gas sales to power plants, they have a stronger bargaining power than the normal C&I customers. As a result, margin for SZ Gas' sales to them is lower than the average customers.
  - However, this can be partly offset by the long-term nature of these contracts (25-30 years), providing a stable demand for SZ Gas and minimising margin fluctuation.

5.4 ESG consideration:

- We would say SZ Gas' social responsibility report is of high quality when compared with other listed A-share companies (Figure 69). However, it is still unable to provide adequate quantifiable measures for its ESG performance. The composition of the board can also be refined to improve the overall governance, as currently it is still dominated by the government related representatives. Despite so, we consider its ESG performance as slightly behind that for Kunlun, partly reflecting the lower ranking of Shanghai Stock Exchange in ESG disclosures for issuers when compared with HKEX (388 HK).

Figure 69: Snapshot of SZ Gas' latest (2018) ESG report



Source: Company data

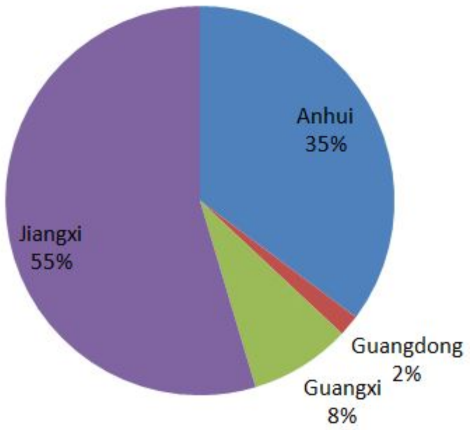
- **Environmental -** Through the "Village within city" conversion, the addition of new household with access to gas supply has reduced carbon emission by 1.5m tonnes in 2018. The increased use of natural gas in Shenzhen has also reduced smoggy days in the city from 154 in 2008 to 20 in 2018. SZ Gas is also conscious of the green environment in its daily operations and office administration. By moving to electronic invoices and statements, SZ Gas has cut down the usage of paper by 16m pieces, or equivalent to 5,500 trees and reduce carbon dioxide emission by 32 tons.
- **Social** - SZ Gas has high requirements on safety training. In 2018, the company spent Rmb1m on safety training with 40,630 man-time received such training. All staffs are required to sign a responsibility letter, promising their adherence to safety requirements. The company has signed long-term contract with Guangdong Dapeng and PetroChina and also invested in natural gas storage in Shenzhen, enhancing the stable accessibility of gas supply to provide services to customers. Customer satisfaction survey indicated a score of 90.92 in 2018, up from 89.97 in 2016 and SZ Gas is awarded "International Outstanding Customer Service Award" by the Hong Kong Customer Service Consortium.

- **Governance -** SZ Gas has a concentrated shareholding with the Shenzhen SASAC owning over 50% of stake. However, with HK&CG and New Hope Group as significant shareholders, this will provide some check and balances for its governance. The company has 10 EDs and 5 INEDs, of which 2 of them are female. For overall staff, female accounted for 29% in 2018. SZ Gas has provided anti-corruption education to its staff based on China's regulatory requirements and compiled case studies for release to staff for education purpose.
- SZ Gas is not rated by MSCI on its ESG performance.

5.5 Risks:

- **Reliance on supply to power station:**
  - SZ Gas' profit growth outlook is partly built on the expectation of the increase in sales to gas-fired power stations. Any delays in their construction will hit its profitability.
  - Power tariffs are heavily regulated and any government policy to cap tariff hike to combat inflation may result in power stations asking SZ Gas for further discounts in gas input.
- **Slower pace in project acquisitions:**
  - We expect PipeChina will intensify the downstream gas utilities competition as new competitors enter the market. SZ Gas' businesses outside of Shenzhen are concentrated in Jiangxi and Anhui (Figure 70). Given SZ Gas' younger age in expansion outside of its hometown, it may face more obstacles in acquisitions than other well-established peers.

Figure 70: Breakdown of SZ Gas' revenue outside of Shenzhen



Source: Company data

- **Take-or-pay for gas supply contracts:**
    - SZ Gas has take-or-pay contracts with Guangdong Dapeng to acquire 0.27m tons of natural gas annually until 2031. Another contract with Petrochina Co Ltd H (857 HK) is for at least 3.6Bcm annually until 2039.
- These take-or-pay contracts mean risk to SZ Gas if its demand is unable to absorb the gas supply. It will then lead to a gas supply surplus and exposes it to market price risk.

5.6 Valuation and catalysts:

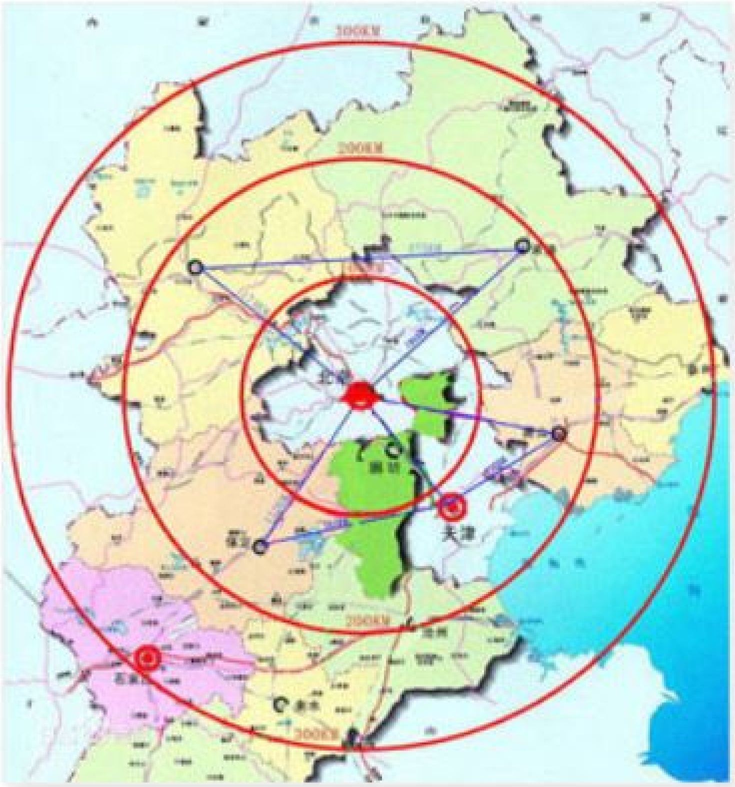
- Thanks to the better performance of the overall A-share market YTD, SZ Gas' share price has picked up in this year, down by just 10%. At 14.8x PER, the stock is at a premium to other A-share gas utilities companies.
- Its low gearing, track record and growth prospects justify a premium valuation against its peers. Consensus EPS forecasts also point to SZ Gas as having the fastest EPS growth in the sector.
- **Catalysts:** 1.) drop in LNG price to lower input costs; 2.) significant acquisitions of projects outside of Shenzhen; and 3.) signing of more gas supply contracts to power plants.

6. Bestsun Energy (600681.CH)

6.1 Background:

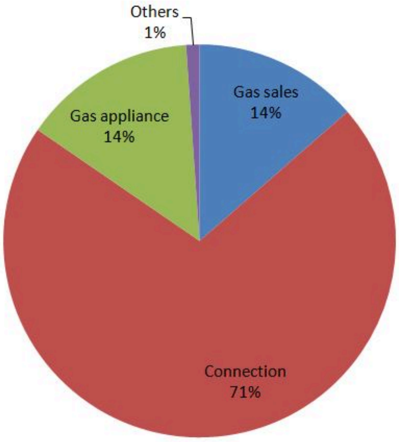
- A-share Bestsun Energy (Bestsun) is the smallest gas utilities company covered in this Smartkarma Original. It is a privately-owned enterprise (POE) with Wang Donghai as the controlling shareholder holding a 44.2% effective stake.
- The company mostly focuses on the Beijing-Tianjin-Hebei area (Figure 71), and currently serves a population of 5m with key businesses include piped gas, construction and installation, sales of appliances and operations of CNG gas stations (Figure 72). Its gas sales accounted for roughly 0.4% of national total in 1H19.

Figure 71: Geographical locations of Bestsun's key projects


300KM
200KM
100KM
天津
200KM
300KM

Source: Company data

Figure 72: Breakdown of profit by business in FY18



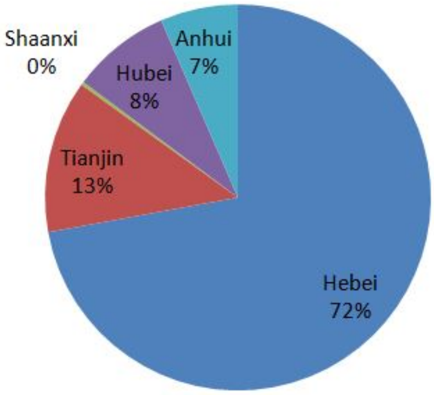
Source: Company data

6.2 Opportunities:

- **Established position in Beijing-Tianjin-Hebei area:**
    - Bestsun started off its gas business in the Beijing-Tianjin-Hebei area and has established a meaningful market position in this region. Over 70% of its gas sales are from this area (Figure 73).

- Due to the concentration of heavy industries, the degree of pollution in this region is worse than many other areas. This has provided Bestsun many opportunities for expansion of natural gas projects.

Figure 73: Breakdown of revenue by area



Source: Company data

- **Expansion through coal-to-gas conversion and acquisitions:**
    - Bestsun has a comfortable financial position (gearing of 19%), allowing it to win more coal-to-gas projects. This is essential as their installment payment nature requires significant working capital.
    - Financial strength is important for a small POE like Bestsun as this will increase its financial flexibility in pursuing acquisitions. Since FY17, Bestsun has acquired projects in Hubei and Anhui.

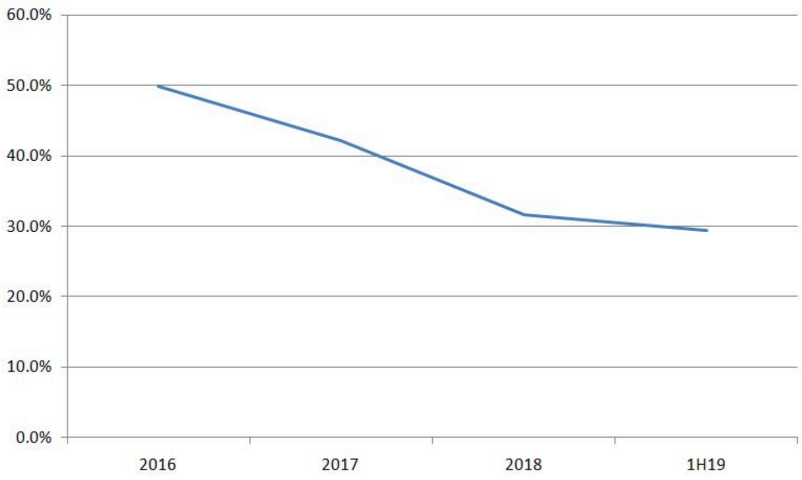
6.3 Revenue and margin drivers:

- **Ramp up of gas sales after conversion and acquisitions (+):**
    - The growth in new customers from coal-to-gas conversion in the last three years and the acquisitions in Hubei and Anhui will accelerate Bestsun's gas sales. Combined with a stable gas sales price, they will drive revenue growth in the next two years.
    - The projects in Hubei and Anhui are currently ramping up their operations. Their gas sale volume growth of 16.2% is ahead of Bestsun's overall growth in 1H19. Together with two new projects

  in Hebei and Liaoning, this will accelerate Bestsun's revenue growth, barring the disruption due to the Covid-19 outbreak which hit Hubei most significantly.

- **Downside risk on connection fee (-):**
  - Bestsun has a very high dependence on connection fee. In FY18, connection fee accounted for 31% of its revenue and 71% of its profit. Such proportion is the highest among its peers. Pressure on connection fee will be a key challenge for its margin going forward.
- **Margin affected by gas supply fluctuation (-):**
  - Unlike many of its larger peers, Bestsun does not have its own LNG Terminal and storage facilities. Its limited flexibility to manage gas supply has led to two consecutive years of margin contraction during gas shortage in 2017-2018 (Figure 74).

Figure 74: Historical gross margin trend



Source: Company data

6.4 ESG consideration:

- There is no ESG or sustainability report published by Bestsun and our assessement is based on information in the Annual Report as well as its website. We consider the lack of disclosures and insufficient information hurdles for us to establish a complete ESG impression on Bestsun. However, based on the available information, we only consider Bestsun as the lowest ranked one among the gas utilities companies covered in this Smartkarma Original.
- **Environmental** - Partly through Bestsun's natural gas supply services in the Beijing-Tianjin-Hebei area, days of good air quality within the area has reached 50.5%, up 1.2pp YoY, in 2018; and overall PM2.5 concentration was down 11.8%. Bestsun has not reported any violation

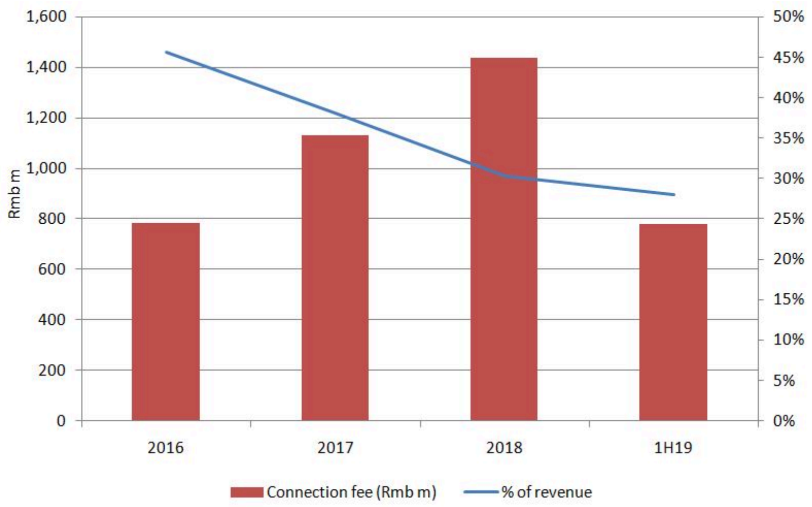
of the regulations under PRC's Ministry of Ecology and Environment. There is no further information on carbon emission, biodiversity and investment in environmental concerns released.

- **Social** - Bestsun conducts regular safety training for its staff and provide education seminars for its customers on safe gas uses. The company promised that gas supply to customers will not be less than 360 days annually, and resolve any supply issues within 24 hours. Bestsun has adopted the policy of providing a one-stop shop, professional, multi-channel and tailor-made services to its customers. No further details on safety, training, supply and customer satisfaction is available.
- **Governance -** Wang Donghai is the major shareholder in Bestsun, owning 44.2% effective stake directly as well as through layers of intermediate holding companies. The rest is mostly owned by institutional and individual investors, suggesting that the shareholder base is quite diversified. However, with all the shares owned by Wang is currently pledged, there are risks of change in ownership that may affect governance. Bestsun has 4 EDs and 3 INEDs, of which none are female. Besides served as the Chairman, Wang is also the CEO of Bestsun, suggesting a lack of division of responsibility. No information is available on its anti-corruption efforts.
- Bestsun is not rated by MSCI on its ESG performance.

6.5 Risks:

- **Heavy exposure to connection fee:**
    - As discussed earlier, the high reliance on connection fee is a key risk for Bestsun. An Rmb100 drop in connection fees is estimated to erode its bottom line by 6%.
    - In FY20 and FY21, we still expect Bestsun to generate over 60% of its profit from connection fees, meaning that such reliance will not subside over the next two years (Figure 75).

Figure 75: Trend of significance of connection fee



Source: Company data

- **Reliance on coal-to-gas projects:**
    - The reliance on coal-to-gas projects is a double-edged sword. While this focus has supported strong historical growth, it will take up Bestsun's financial resources as the counterparties are mostly local governments with payments on installment.
- **Small size facing tough competition:**
    - Compared with larger gas utilities companies, Bestsun is more difficult in securing quality acquisitions due to its small size.
    - The formation of PipeChina will ease Bestsun's access to gas pipeline but in the longer term, it may face tougher competition as this encourages the entry of new players.

6.6 Valuation and catalysts:

- Bestsun has been a consistent underperformer in the sector. Although it appears undervalued at 6.2x PER and 1.2x P/B, we do not see the trend to reverse in the next twelve months.
- High reliance on connection fee has heightened the earnings downgrade risk and the geographically concentrated operations suggest risks that well justified by the low multiples.
- **Catalysts:** 1.) drop in LNG price to lower input costs; 2.) significant acquisitions of immediate earnings accretive projects; and 3.) financial results demonstrating the resilience of profit from connection fee.

Conclusion

China's Gas Utilities sector is a very interesting sector as it combines the advantages of both the upside from China's clean energy initiative and the downside protection from a relatively stable demand pattern. We believe that, although having outperformed significantly in the last five years, excellent value can still be extracted from the sector.

In our view, the Covid-19 outbreak will only be a drag on gas consumption in the short term, but this will not affect China's structural growth in gas demand over the long term. We are positive towards the outlook for the sector, and believe that the best stocks can be identified through the analysis of opportunities, risks, Environmental, ESG, financial strength, profitability and valuation. Based on our analysis, our top picks in the sector are ENN Energy (2688 HK) and China Resources Gas (1193 HK).

Disclosure & Certification

- I/We have position(s) in one or more of the securities referenced in this insight
- Views expressed in this insight accurately reflects my/our personal opinion(s) about the referenced securities and issuers and/or other subject matter as appropriate.
- This insight does not contain and is not based on any non-public, material information.
- To the best of my/our knowledge, the views expressed in this insight comply with Singapore law as well as applicable law in the country from which it is posted
- I/We have not been commissioned to write this insight or hold any specific opinion on the securities referenced therein
- I/We have signed the Insight Provider Agreement and this insight does not violate any of the terms specified therein.

— Osbert Tang, CFA (13 Mar 2020)

Osbert Tang, CFA

China Analyst - Onshore Credit, Equity Long-Short

Osbert Tang is an equity analyst with over 20 years of experience focusing on China's transport, infrastructure, industrials, and utilities sectors. He has been based in Shanghai since 2003, accumulating more than 15 years of on-ground knowledge on the Chinese economy and financial markets, and has a wealth of contacts with China corporates and government entities.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: Hong Kong, China
- Sectors: Industrials, Utilities

Content Verticals

- Equity Bottom-Up, Thematic (Sector/Industry)

Thematic (Sector/Industry)

China Aerospace & Defense A Shares: An In-Depth Walkthrough

By Osbert Tang, CFA | 28 May 2020

EXECUTIVE SUMMARY

China's aerospace and defense industry offers unique investment opportunity to investors, but due to its high sensitivity, all major companies involved are listed as A-shares in either the Shanghai or the Shenzhen Stock Exchanges only. With the rise in global geopolitical tension, increase in the civilian uses of defense technology, the government's support of the industry and the potential for further asset injection and restructuring of the listed companies, we are positive on the outlook of the sector.

While there are risks in the investment in this industry of national importance, we believe that they are outweighed by the potential returns. Among the MSCI China A-share constituents in the sector, we prefer Avic Shenyang Aircraft (600760 CH) and AECC Aviation Power (600893 CH). These are then followed by Avic Aircraft Co Ltd A (000768 CH) and China Spacesat Co Ltd A (600118 CH), respectively. However, we ranked China Avionics Systems Co (600372 CH) as the least attractive play among the five stocks.

What's Original?

This Smartkarma Original covers the opportunities and risks for the sector by looking at the recent geopolitical developments, including the US-China political and trade tension, and their implications on the future development of China's defense spending and the market outlook of the aerospace and defense industry. We analyse the revenue and margin drivers, provide global comparison and present our views on the A-share aerospace & defense companies. We also look from the perspectives of potential asset restructuring and industry consolidation given the many unlisted central State-owned enterprises (SOEs) involved in this business and the numerous listed companies under these SOEs. In addition, we address the background and characteristics of the aerospace & defense central SOEs (unlisted parents of these listed companies) as they are essential to the understanding of the listed companies.

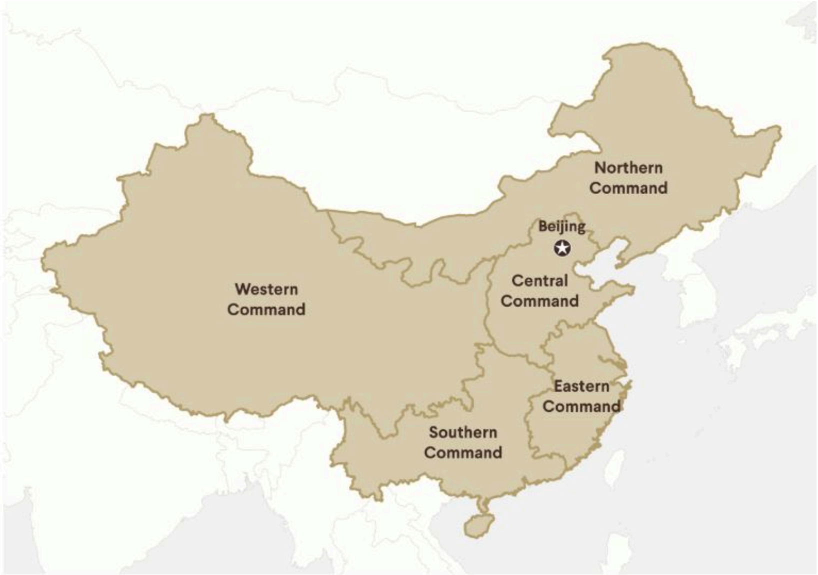
DETAIL

Background

China's aerospace and defense industry has a long history dated back to the mid-1950s. The development of the aerospace industry is widely considered to have started from 1956 when the Fifth Research Academy of the Ministry of National Defense missile development organisation was set up under the recommendation of Dr. Qian Xuesen (钱学森博士), the "Father of Chinese Rocketry". Following series of reorganisations, the Fifth Research Academy has restructured into the current China National Space Administration (CNSA) under the Ministry of Industry and Information Technology, with the commercial functions being allocated to various commercial enterprises owned directly and indirectly by the State-owned Assets Supervision and Administrative Commission of the State Council (SASAC). As for the defense industry, most of the current enterprises are established to take over the original commercial functions of the Ministry of Machinery and Electronics Industry (中华人民共和国机械电子工业部) in 1999. The aerospace and defense industry in China has close tie to the country's military force - People's Liberation Army (PLA) - and many central State-owned enterprise (SOEs) under the SASAC.

As a background, the PLA is currently the world's largest armed forces. The PLA consists of five professional service branches: the Ground Force, Navy, Air Force, Rocket Force, and the Strategic Support Force, with a total active personnel of 2.04m. In Feb 2016, under the decision of the Central Military Commission (CMC) of the Communist Party of China (CPC), the PLA underwent a significant restructuring. The key changes are the elimination of the four PLA General Departments and the streamlining of the seven Military Regions (Beijing, Shenyang, Jinan, Lanzhou, Chengdu, Guangzhou and Nanjing) into five Theater Commands, namely Eastern, Southern, Western, Northern and Central (Figure 1).

Figure 1: PLA's theater commands



Areas of responsibility

Central Command
Beijing, security for CCP leadership, and support to other theaters

Eastern Command
Taiwan, East China Sea and the Senkaku/Diaoyu Islands, and Japan

Northern Command
Korean Peninsula, borders with Russia and Mongolia, and Yellow Sea

Southern Command
South China Sea and borders with Southeast Asian countries

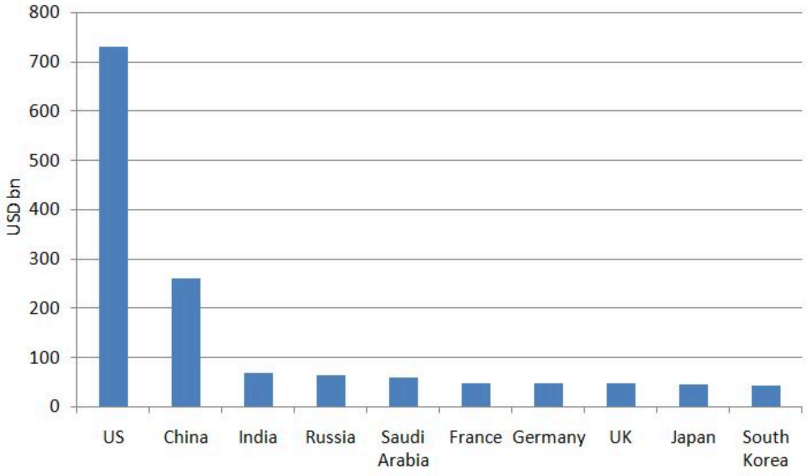
Western Command
Border with India and counterterrorism

Source: Strafor, US Department of Defense

In 2019, China has a total defense spending of Rmb1,804bn (US$261bn)*, a growth of 7.5% YoY, ranking it as the second highest one, surpassed only by the US (Figure 2). The immense size of China's defense spending, the growing geopolitical tension, increase in civilian uses of defense technology and the government's support of the industry will present huge room for the sector's growth, in our view. Given that most of China's aerospace and defense companies are listed in the domestic A-share markets, the participation of foreign institutional investors has been limited. With the recent abolishment of the QFII and RQFII quotas, this is an excellent opportunity for overseas investors to look into this rapidly growing sector in China.

**based on data from Stockholm International Peace Research Institute (SIPRI) which include estimates for items not included in the official defense budget.*

Figure 2: Top ten countries with the highest defense spending in 2019

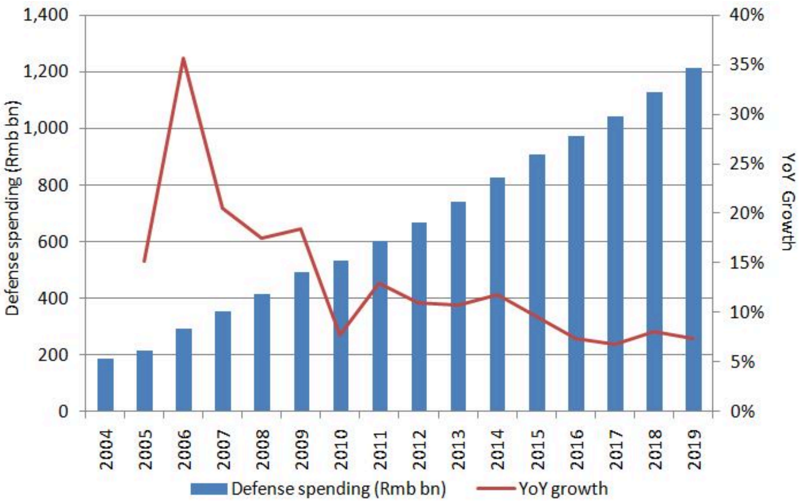


Source: SIPRI

Opportunities

1. Growth in China's defense spending. Without question, the most important driver for the growth of the aerospace and defense sector in China is the country's defense spending. Based on China's official statistics, between 2010 and 2019, China's defense spending increased by a whopping 127% to Rmb1.2trn (Figure 3). Based on the 2020 budget, this is set to grow by another 6.6% in this year. Although the absolute number looks significant, on a relative sense, China's defense spending does not stand out as particularly high.

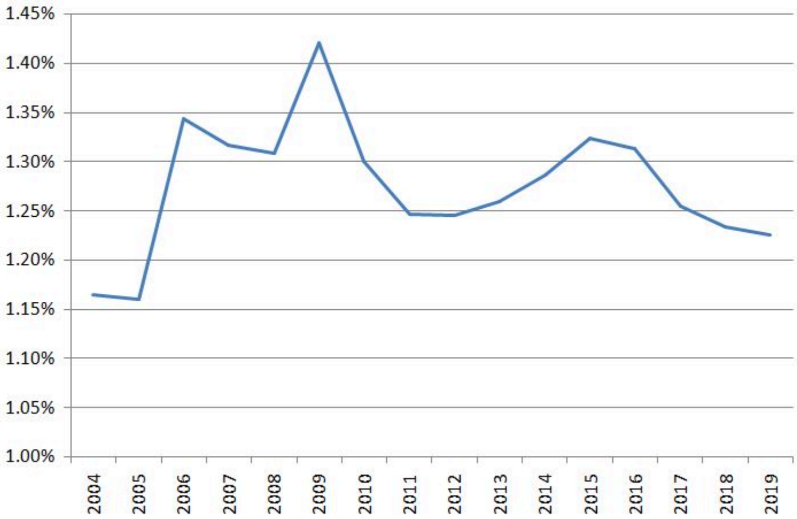
Figure 3: Defense spending of China



Source: National Bureau of Statistics (NBS)

In fact, as a percentage of GDP, China's defense spending has been ranging between 1.1% and 1.4% since 2004, with the recent trend being closer to the low end of such range (Figure 4).

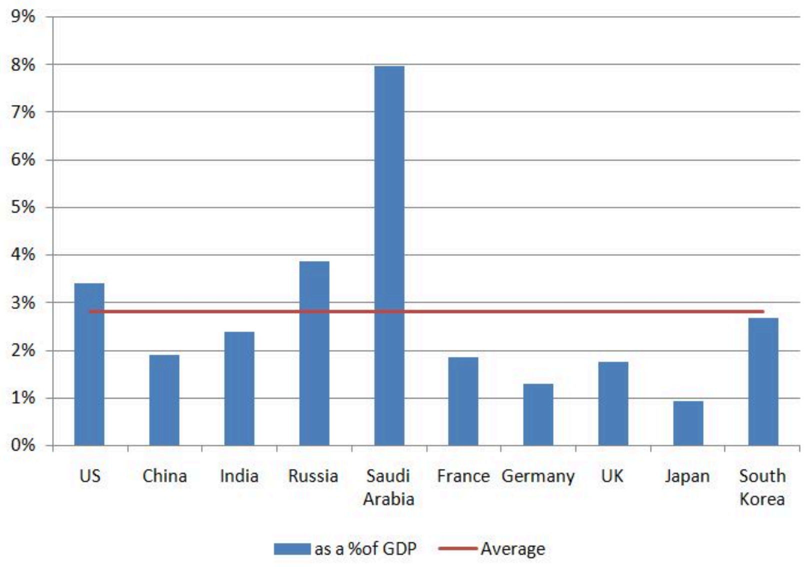
Figure 4: Trend of China's defense spending as a % of GDP



Source: NBS

Based on calculation from SIPRI (note that their calculation of China's defense spending is higher as it includes estimates for items not included in the official defense budget), as a percentage of GDP, the ten countries with the highest total defense spending spent between 0.93% (Japan) to 7.98% (Saudi Arabia) of their GDP in 2019 on defense. Even under SIPRI's calculation which China is at 1.89%, it is still below the average of 2.8% for the top ten (Figure 5). Also, on a per capita basis, China's defense spending amounted to just US$182, which is substantially lower than the top three countries - Israel at US$2,402, US at US$2,224 and Singapore at US$1,931.

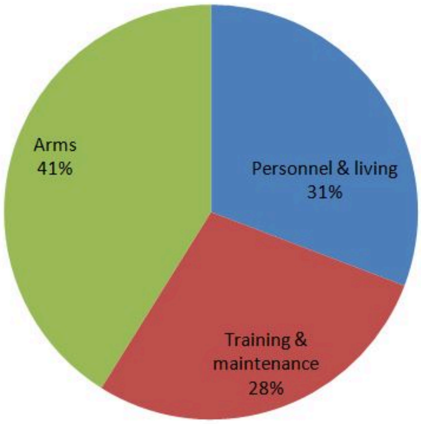
Figure 5: Comparison of defense spending as a percentage of GDP



Source: SIPRI

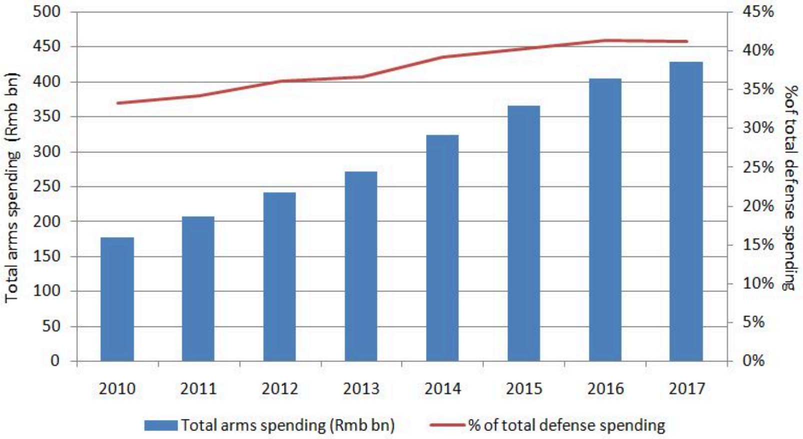
China's defense spending is mostly used on three areas - arms, personnel & living and training & maintenance, with arms taking up the largest share. In 2017, arms accounted for 41% of China's total defense spending (Figure 6). On the back of the increase in technologically advanced weapons and the growth in new arms development, the share of arms in China's total spending has been continuously increasing. This has grown from about 33% in 2010 to 41% in 2017 (Figure 7), and with the sustained focus on technological improvement and upgrade of the defense system, we expect the proportion will further increase in the next few years. This will be positive towards China's aerospace and defense industry due to the increase in derived demand from arms investments.

Figure 6: Breakdown of China's defense spending



Source: White Paper on China's Defense in the New Era

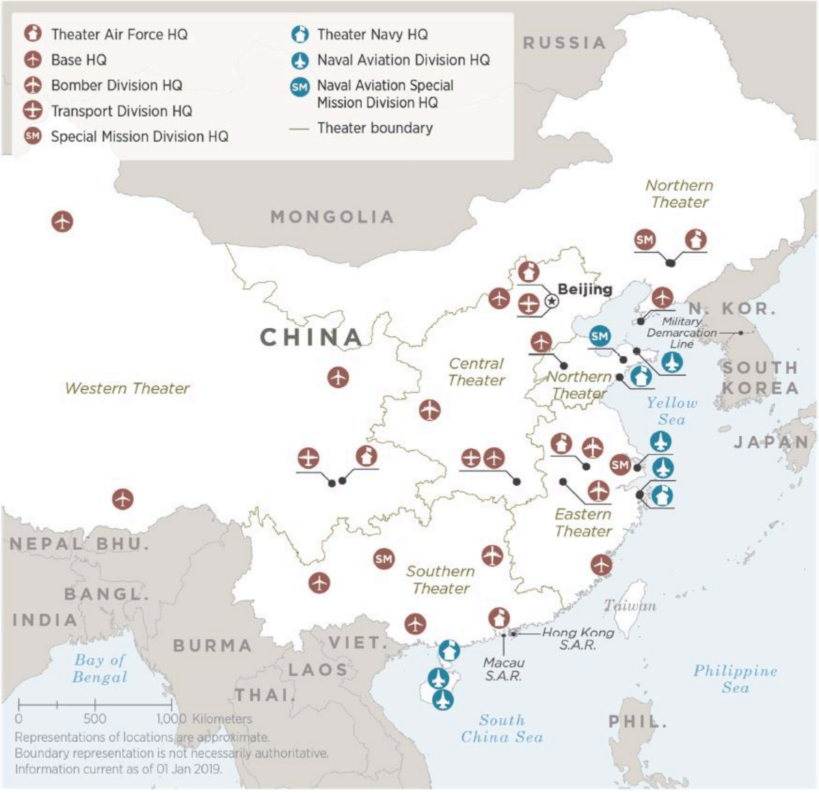
Figure 7: Trend of growth in spending on arms



Source: White Paper on China's Defense in the New Era

We believe the industry will benefit from the development of China's military capacity and capability, particularly the PLA Air Force (PLAAF). China has an extensive air force coverage in its domestic territory with major aviation units all distributed in its five theater commands (Figure 8).

Figure 8: PLA's major aviation unit

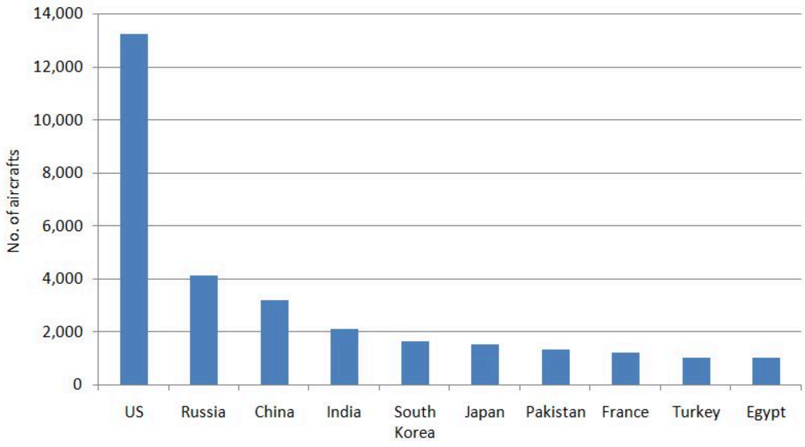

Theater Air Force HQ
Base HQ
Bomber Division HQ
Transport Division HQ
SM Special Mission Division HQ
Theater Navy HQ
Naval Aviation Division HQ
SM Naval Aviation Special Mission Division HQ
Theater boundary
RUSSIA
MONGOLIA
Northern Theater
Beijing
N. KOR.
Military Demarcation Line
CHINA
Central Theater
Northern Theater
Yellow Sea
SOUTH KOREA
JAPAN
Western Theater
Eastern Theater
NEPAL
BHU.
BANGL.
INDIA
Southern Theater
Taiwan
Hong Kong S.A.R.
Macau S.A.R.
BURMA
VIET.
LAOS
THAI.
Bay of Bengal
Philippine Sea
South China Sea
PHIL.
0
500
1,000 Kilometers

Representations of locations are approximate.
Boundary representation is not necessarily authoritative.
Information current as of 01 Jan 2019.

Source: Military and Security Developments Involving the People's Republic of China 2019

According to Global Firepower, China has the third strongest air service strength in the world in 2020, with number one goes to, obviously, the US and number two Russia (Figure 9). China is then followed by India as the fourth and South Korea the fifth. The PLAAF has a total active personnel of ~398,000 and is the third largest in the world. We believe the need to maintain its air force power relative to the US, Russia and India will involve more aerospace and defense spending and this will be structurally positive to the companies in this sector.

Figure 9: Military aircrafts by country



Source: Global Firepower

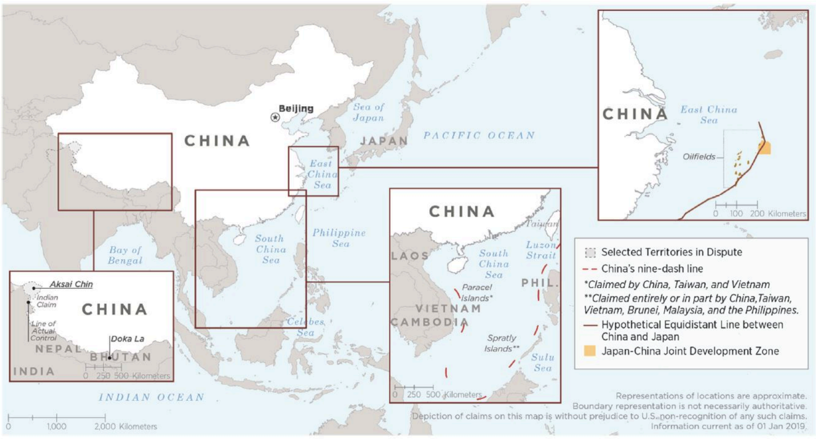
2. Increase in US-China political tension. The US-China relation used to be in a more harmonious situation for a short period right after President Donald Trump assumed office in Jan 2017. Trump hosted President Xi Jinping for a two-day summit at Mar-a-Lago in early Apr 2017 and commented "tremendous progress" in the U.S.-China relationship. On 8 Nov 2017, Trump visited Beijing and he reiterated the importance of trade development between the two countries and reaffirmed the American support for the One-China policy.

However, since then, the US-China relation has deteriorated as the Trump administration increasingly move towards an "America first" approach. The outbreak of the US-China Trade War in Mar 2018 exacerbated the tension on the relationship between the two countries. This is followed by Vice President Mike Pence's speech during his Asian trip in Oct 2018 which further signaled the deterioration of the two countries' relation.

> *But I come before you today because the American people deserve to know that, as we speak, Beijing is employing a whole-of-government approach, using political, economic, and military tools, as well as propaganda, to advance its influence and benefit its interests in the United States.*
>
> *In our National Security Strategy that the President Trump released last December, he described a new era of "great power competition." Foreign nations have begun to, as we wrote, "reassert their influence regionally and globally," and they are "contesting [America's] geopolitical advantages and trying [in essence] to change the international order in their favor."*
>
> *In this strategy, President Trump made clear that the United States of America has adopted a new approach to China. We seek a relationship grounded in fairness, reciprocity, and respect for sovereignty, and we have taken strong and swift action to achieve that goal.*

The roll out of the "Belt and Road" Initiative by China, nicknamed as "debt trap' by many US politicians, and the ongoing China territorial claims (Figure 10) have raised further concerns by US on China's growing economic and political influences globally which challenge the global leadership position of the US. In fact, even before the Trump administration, the Obama administration has already stated clearly the US's policy of rebalancing to Asia. Against this backdrop, the rise of China is clearly not to the advantage of the US.

Figure 10: China's major territorial claims

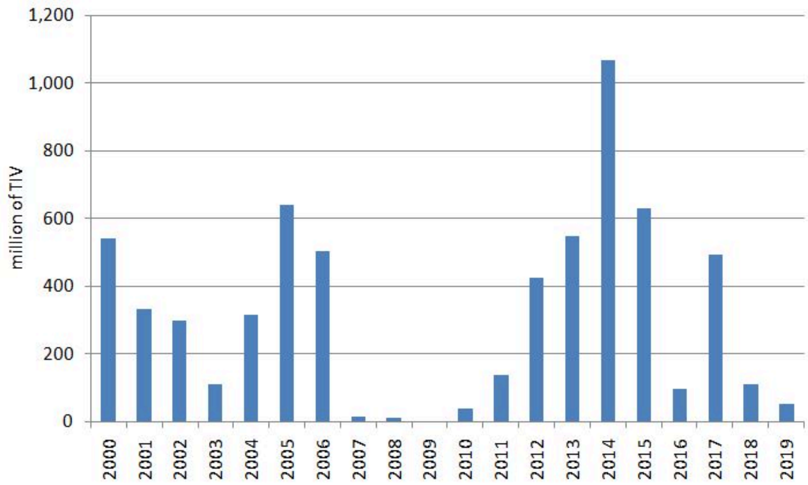

Beijing
CHINA
Sea of Japan
JAPAN
PACIFIC OCEAN
East China Sea
South China Sea
Philippine Sea
Bay of Bengal
Celebes Sea
INDIAN OCEAN
0 1,000 2,000 Kilometers
Aksai Chin
Indian Claim
Line of Actual Control
CHINA
Doka La
NEPAL
BHUTAN
INDIA
0 250 500 Kilometers
CHINA
LAOS
South China Sea
Taiwan
Luzon Strait
PHIL.
Paracel Islands*
VIETNAM
CAMBODIA
Spratly Islands**
Sulu Sea
0 250 500 Kilometers
CHINA
East China Sea
Oilfields
0 100 200 Kilometers
▨ Selected Territories in Dispute
- - China's nine-dash line
*Claimed by China, Taiwan, and Vietnam
**Claimed entirely or in part by China,Taiwan, Vietnam, Brunei, Malaysia, and the Philippines.
— Hypothetical Equidistant Line between China and Japan
🟧 Japan-China Joint Development Zone
Representations of locations are approximate.
Boundary representation is not necessarily authoritative.
Depiction of claims on this map is without prejudice to U.S. non-recognition of any such claims.
Information current as of 01 Jan 2019.

Source: Military and Security Developments Involving the People's Republic of China 2019

The stance of the US in the cross-strait relationship has always been a major obstacle on US-China relation. Even before assuming office, Trump, as President-elect, has already had telephone conversation with Taiwan's leader Tsai Ing-wen on 2 Dec 2016, which was the first such contact with Taiwan by an American president-elect or president since 1979. Lately, on 26

Mar 2020, Trump signed Taiwan Allies International Protection and Enhancement Initiative (TAIPEI) Act, which requires increased U.S. support for Taiwan internationally. Recently, the US rallies support to back Taiwan's observer status World Health Assembly also further upsets China. These moves have added more fuel to the fire of the US-China relation. In fact, historically, US have been a solid supporter of Taiwan's defense. Since 2000, US has accounted for over 95% Taiwan's total arms import, with the rest being from France, Germany, Italy and Israel but all of the others took place before 2014 (Figure 11).

Figure 11: US arms sales to Taiwan



Note: TIV is the special unit used by SIPRI for standardised measurement of different types of arms. Source: SIPRI

We are not political analysts but just from the sequences of political events happened since the Trump administration (Figure 12), it is obvious that the US-China relation has entered into an increasingly hard time. The outbreak of Covid-19 early this year has added to the heat-up of the relation between the two countries. The US has accused China of its failure in early containment of the pandemic, leading to its massive spread outside of China and causing numerous death and economic losses globally. Lately, the US has accused China of hacking attempts on US groups researching vaccines, treatments and testing.

Figure 12: Key events in US-China relations since Trump administration

Date	Key event	Details
February 9, 2017	Trump Affirms One China Policy After Raising Doubts	Trump says he will honor the One China policy in a call with President Xi Jinping. After winning the presidential election, Trump breaks with established practice by speaking on the telephone with Taiwanese President Tsai Ing-wen and questioning the U.S. commitment to its One China policy.
April 6 – 7, 2017	Trump Hosts Xi at Mar-a-Lago	Trump welcomes President Xi Jinping for a two-day summit at the Mar-a-Lago estate in Florida, where bilateral trade and North Korea top the agenda. Afterward, Trump touts "tremendous progress" in the U.S.-China relationship and Xi cites a deepened understanding and greater trust building.

March 22, 2018	Trump Tariffs Target China	The Trump administration announces sweeping tariffs on Chinese imports, worth at least US$50 bn, in response to what the White House alleges is Chinese theft of U.S. technology and intellectual property. Coming on the heels of tariffs on steel and aluminum imports, the measures target goods including clothing, shoes, and electronics and restrict some Chinese investment in the United States. China imposes retaliatory measures in early April on a range of U.S. products, stoking concerns of a trade war between the world's largest economies.
July 6, 2018	U.S.-China Trade War Escalates	The Trump administration imposes fresh tariffs totaling US$34 bn worth of Chinese goods. More than eight hundred Chinese products in the industrial and transport sectors, as well as goods such as televisions and medical devices, will face a 25% import tax. China retaliates with its own tariffs on more than five hundred U.S. products. The reprisal, also valued around US$34 bn, targets commodities such as beef, dairy, seafood, and soybeans.
October 4, 2018	Pence Speech Signals Hard-Line Approach	U.S. Vice President Mike Pence delivers a speech marking the clearest articulation yet of the Trump administration's policy toward China and a significant hardening of the United States' position. Pence says the United States will prioritize competition over cooperation by using tariffs to combat "economic aggression." He also condemns what he calls growing Chinese military aggression, especially in the South China Sea, criticizes increased censorship and religious persecution by the Chinese government, and accuses China of stealing American intellectual property and interfering in U.S. elections.
December 1, 2018	Canada Arrests Huawei Executive	Meng Wanzhou, the chief financial officer of Chinese telecom and electronics company Huawei, is arrested in Canada at the United States' request. The U.S. Justice Department alleges Huawei and Meng violated trade sanctions against Iran and committed fraud and requests her extradition. In apparent retaliation, China detains two Canadian citizens, who officials accuse of undermining China's national security. Calling Meng's arrest a "serious political incident," Chinese officials demand her immediate release.
March 6, 2019	Huawei Sues the United States	Amid legal proceedings against Meng, Huawei sues the United States in a separate lawsuit for banning U.S. federal agencies from using the telecom giant's equipment. In a battle with Beijing for technological supremacy, the Trump administration launches an aggressive campaign warning other countries not to use Huawei equipment to build 5G networks, claiming the Chinese government could use the company to spy.
May 10, 2019	Trade War Intensifies	After trade talks break down, the Trump administration raises tariffs from 10-25% on US$200 bn worth of Chinese goods. China retaliates by announcing plans to increase tariffs on US$60 bn worth of American goods. Trump says he believes the high costs imposed by tariffs will force China to make a deal favorable to the United States, while China's Foreign Ministry says the United States has "extravagant expectations." Days later, the Trump administration bans U.S. companies from using foreign-made telecommunications equipment that could threaten national security, a move believed to target Huawei. The U.S. Commerce Department also adds Huawei to its foreign entity blacklist.
August 5, 2019	U.S. Labels China a Currency Manipulator	After China's central bank lets the Renminbi weaken significantly, the Trump administration designates China a currency manipulator. The designation, applied to China for the first time since 1994, is mainly symbolic, but it comes less than a week after Trump announced higher tariffs on US$300 bn worth of goods. That means everything the United States imports from China now faces taxes. Beijing warns that the designation will "trigger financial market turmoil."
November 27, 2019	Trump Signs Bill Supporting Hong Kong Protesters	Trump signs the Hong Kong Human Rights and Democracy Act after it passes in the US Congress with overwhelming majorities. The legislation authorizes the US to sanction individuals responsible for human rights abuses in Hong Kong. It also requires US officials to evaluate every year whether Hong Kong enjoys a "high degree of autonomy" from Beijing. Many of the pro-democracy protesters, who have been demonstrating since June, celebrate the bill's passage. Chinese officials condemn the move, impose sanctions on several US-based organizations, and suspend US warship visits to Hong Kong.
January 15, 2020	'Phase One' Trade Deal Signed	President Trump and Chinese Vice Premier Liu He sign the agreement, a breakthrough in the nearly two-year trade war between the world's two largest economies. The deal relaxes some U.S. tariffs on Chinese imports and commits China to buying an additional US$200 bn worth of American goods, including agricultural products and cars, over two years. China also pledges to enforce intellectual property protections. But the agreement maintains most tariffs and does not mention the Chinese government's extensive subsidies, a longtime concern of the United States, though Trump says these could be tackled in a future deal. Days before the signing, the United States dropped its designation of China as a currency manipulator.

January 31, 2020	Tensions Soar Amid Coronavirus Pandemic	The Trump administration bars all non-US citizens who recently visited mainland China from entering the US amid an outbreak of a new coronavirus that was first reported in the Chinese city of Wuhan. Leading officials in both China and the United States blame the other side for the pandemic. A Chinese Foreign Ministry spokesperson claims that the US military brought the virus to China, while Trump makes repeated references to the "Chinese virus," which he says spread because of failures by the Chinese government. In April, top officials in both countries change their tones by highlighting areas for cooperation amid the crisis. Still, Trump faults the WHO for being biased toward China and halts U.S. funding to the organization.
March 18, 2020	China Expels American Journalists	The Chinese government announces it will expel at least thirteen journalists from three U.S. newspapers—the New York Times, Wall Street Journal, and Washington Post—whose press credentials are set to expire in 2020. Beijing also demands that those outlets, as well as TIME and Voice of America, share information with the government about their operations in China. The Chinese Foreign Ministry says the moves are in response to the U.S. government's decision earlier in the year to limit the number of Chinese journalists from five state-run media outlets in the United States to 100, down from 160, and designate those outlets as foreign missions.
March 26, 2020	Trump signed Taiwan TAIPEI Act	President Donald Trump signed the TAIPEI Act, a bill expressing Washington's support for Taiwan in strengthening its relationships with countries around the world. The United States should use every tool to support Taiwan's standing on the international stage," Gardner said in a joint announcement with Coons. "This bipartisan legislation demands a whole-of-government approach to ramp up our support for Taiwan, and will send a strong message to nations that there will be consequences for supporting Chinese actions that undermine Taiwan.
April 22, 2020	Trump threatens to cancel China trade deal	Trump has threatened to terminate the trade deal with China if Beijing did not honour its provisions in the wake of the coronavirus pandemic that originated in the country. However, the US-China Economic and Security Review Commission in a report said China could invoke a clause in the agreement that allows for fresh trade consultations between the two countries "in the event of a natural disaster or other unforeseeable event". Trump said "If that happens, we'll do a termination and we'll do what I can do better than anybody".
May 13, 2020	Federal Thrift board pauses TSP China investment	Federal Retirement Thrift Investment Board, Washington, voted unanimously Wednesday to pause its implementation of plans to shift billions of dollars in retirement assets to an index fund that includes Chinese companies, citing the COVID-19 pandemic and newly nominated board members.
May 19, 2020	US accuses China of hacking coronavirus research	The Federal Bureau of investigation and the Department of Homeland Security are preparing to issue a warning that China's most skilled hackers and spies are working to steal American research in the crash effort to develop vaccines and treatments for the coronavirus. The efforts are part of a surge in cybertheft and attacks by nations seeking advantage in the pandemic..The FBI said that the cyber-thieves had "been observed attempting to identify and illicitly obtain valuable intellectual property and public health data" on treating the coronavirus.

Source: Council on foreign relations, various media reports

The increasingly sour relation is best described by the comment made by Henry Kissinger, the US Secretary of State during the Nixon administration, even before the Covid-19 outbreak, in Nov 2019.

> *"China is a major economic country, and so are we. And so we are bound to step on each other's toes all over the world, in the sense of being conscious of the purposes of the other," Kissinger said. "Therefore, if conflict is permitted to develop unconstrained, the outcome could be even worse than it was in Europe," he said, referring to World War I.*

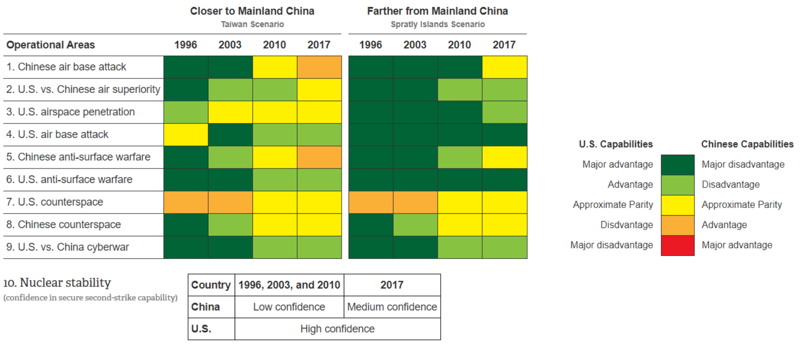
Recent US military moves and exercises further reflected that the country is increasingly uncomfortable with China's political rise after the significant economic achievement. For example, in early May, the US surface action group (SAG), which comprises three destroyers and other ships, conducted an Arctic operations in joint force with the UK in the Barents Sea. The joint

SAG made up of about 1,200 Sailors from the US and UK, and it is the first time that Navy ships have operated in the area since the mid-1980s. Kenneth J. Braithwaite, the current U.S. ambassador to Norway and nominee to become the 77th Navy secretary, has committed his advocacy to increasing U.S. Navy presence in the region to counter both "Great Power Competitors" China and Russia.

> *"The Chinese and the Russians are everywhere, especially the Chinese..."*
>
> *"You would be alarmed at the amount of Chinese activity off the coast of Norway in the high north. We need to be vigilant to that to understand why."*

Given such heightened US-China political tension, we see the potential for China to step up its defense spending in an effort to narrow the gap of the military strength between the two countries (Figure 13). Even Hu Xijin, the chief editor of Global Times, a quasi-government newspaper of China, said that China needs to expand its nuclear warhead to over 1,000 to strengthen nuclear deterrent - see his tweet below (Figure 14).

Figure 13: US-China military scorecard



	Closer to Mainland China Taiwan Scenario				Farther from Mainland China Spratly Islands Scenario			
Operational Areas	**1996**	**2003**	**2010**	**2017**	**1996**	**2003**	**2010**	**2017**
1. Chinese air base attack	🟩	🟩	🟨	🟧	🟩	🟩	🟩	🟨
2. U.S. vs. Chinese air superiority	🟩	▧	▧	🟨	🟩	🟩	▧	▧
3. U.S. airspace penetration	▧	🟨	🟨	🟨	🟩	🟩	🟩	▧
4. U.S. air base attack	🟨	🟩	▧	▧	🟩	🟩	🟩	🟩
5. Chinese anti-surface warfare	🟩	▧	🟨	🟧	🟩	🟩	▧	🟨
6. U.S. anti-surface warfare	🟩	🟩	▧	▧	🟩	🟩	🟩	🟩
7. U.S. counterspace	🟧	🟧	🟨	🟨	🟧	🟧	🟨	🟨
8. Chinese counterspace	🟩	▧	🟨	🟨	🟩	▧	🟨	🟨
9. U.S. vs. China cyberwar	🟩	🟩	▧	▧	🟩	🟩	▧	▧

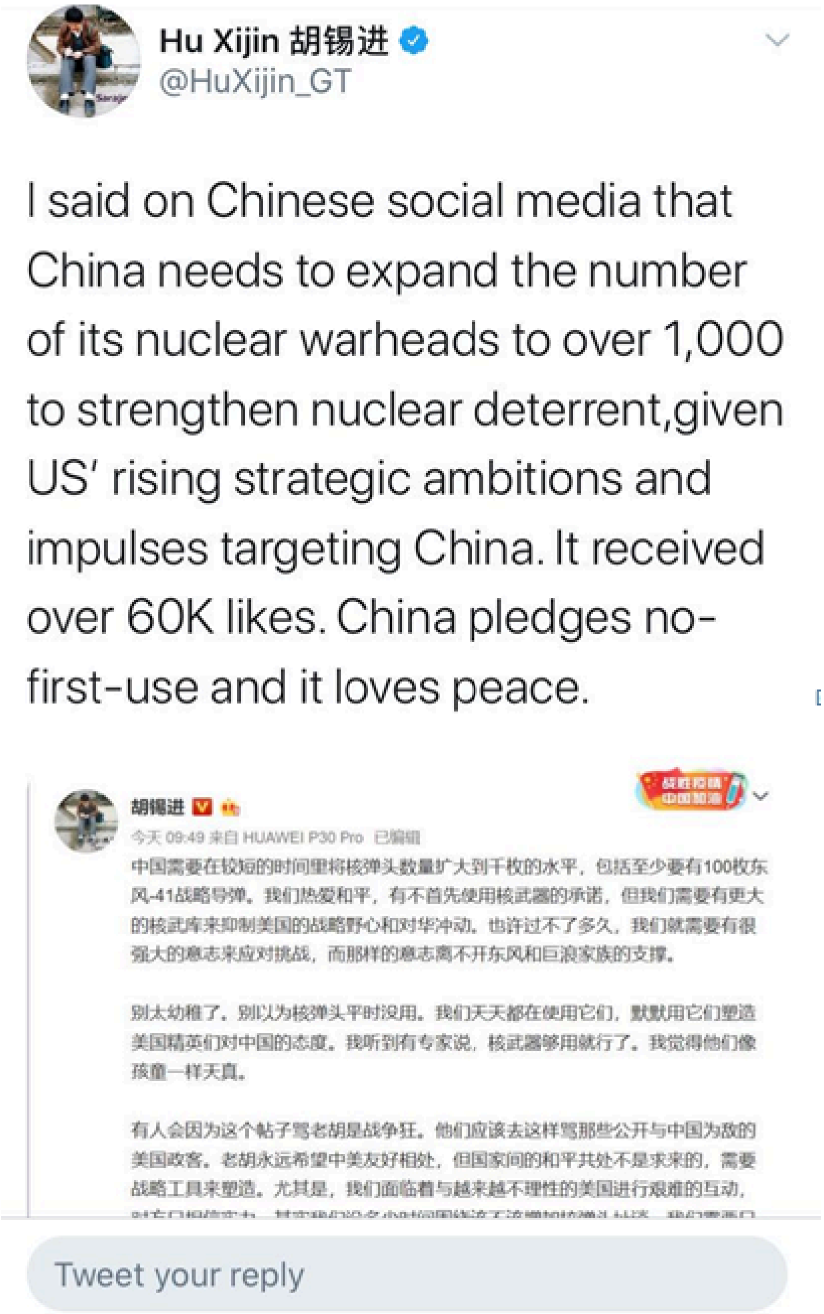
10. Nuclear stability
(confidence in secure second-strike capability)

Country	**1996, 2003, and 2010**	**2017**
China	Low confidence	Medium confidence
U.S.	High confidence	

U.S. Capabilities		**Chinese Capabilities**
Major advantage	🟩	Major disadvantage
Advantage	▧	Disadvantage
Approximate Parity	🟨	Approximate Parity
Disdvantage	🟧	Advantage
Major disadvantage	🟥	Major advantage

Source: RAND

Figure 14: Tweet by Global Times chief editor Hu Xjin



I said on Chinese social media that China needs to expand the number of its nuclear warheads to over 1,000 to strengthen nuclear deterrent,given US' rising strategic ambitions and impulses targeting China. It received over 60K likes. China pledges no-first-use and it loves peace.

胡锡进

今天 09:49 来自 HUAWEI P30 Pro 已编辑

中国需要在较短的时间里将核弹头数量扩大到千枚的水平，包括至少要有100枚东风-41战略导弹。我们热爱和平，有不首先使用核武器的承诺，但我们需要有更大的核武库来抑制美国的战略野心和对华冲动。也许过不了多久，我们就需要有很强大的意志来应对挑战，而那样的意志离不开东风和巨浪家族的支撑。

别太幼稚了。别以为核弹头平时没用。我们天天都在使用它们，默默用它们塑造美国精英们对中国的态度。我听到有专家说，核武器够用就行了。我觉得他们像孩童一样天真。

有人会因为这个帖子骂老胡是战争狂。他们应该去这样骂那些公开与中国为敌的美国政客。老胡永远希望中美友好相处，但国家间的和平共处不是求来的，需要战略工具来塑造。尤其是，我们面临着与越来越不理性的美国进行艰难的互动，

Source: Hu Xijin's twitter

3. US-China trade tension and export opportunities. The US-China trade tension has already affected their trade activities. In the first four months of 2020, total trade value between the two countries has contracted by 15.2%, significantly worse than the 7.5% reduction in China's overall trade value.

On 16 Feb 2020, the Trump administration has considered to revoking a license that allows CFM International, a joint venture between General Electric (GE) Aviation, a division of General Electric Co (GE US) and Safran Aircraft Engines, a division of Safran SA (SAF FP) of France, to export LEAP

1C jet engines to China. LEAP 1C engine is selected by Commercial Aircraft Corporation of China (COMAC) as the sole Western powerplant for its new C919 single-aisle jetliner (Figure 15). Two months later, on 7 Apr, the US government reapproved licence for LEAP engine sales to COMAC. Although the engine supply issue has now resolved, the incident clearly indicates an heightened risk of an "embargo" for essential engine requirement by COMAC is present. We believe the case clearly raise China's intention to further strengthen its own ability in jet engine development, otherwise the commercialisation of its C919 jet planes will subject to numerous constraints. Such direction, we believe, will mean more investment devoted for R&D for the localisation of key aerospace and aviation parts and components in China, and should be positive to the companies in the aerospace and defense industry.

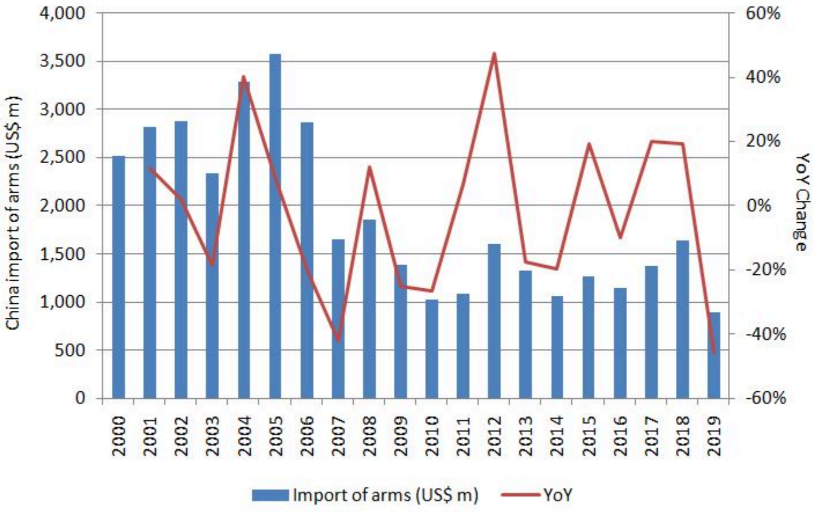
Figure 15: COMAC's C919

C919
B-001A
中国商用飞机有限责任公司
C919
LEAP

Source: COMAC

Over the last ten years, China has significantly reduced its arms import. This is mainly due to the intention to reduce its reliance of foreign countries and the improvement in technological research that increasingly support self-developed weapons. Import of arms has reduced by 75% from the peak of US$3.6bn in 2005 to just US$890m in 2019, a historical low (Figure 16). We believe the localisation trend is set to sustain as China continues to push for self-sufficient in its arms supply.

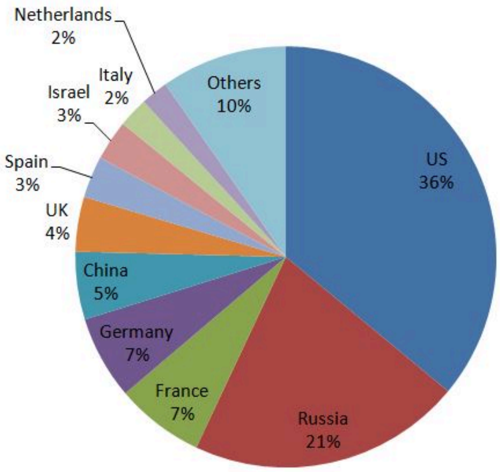
Figure 16: Trend of China's import of arms



Source: Wind

With the technological advancement, China is in fact in a good position to raise its market share in global arms export. Between 2014 and 2018, China is only the fifth largest exporter of arms globally with a tiny 5% market share (Figure 17). Meanwhile, the US, as the largest arms exporter globally, has a share of 36% - some 7x of China's. Even for France and Germany which have a smaller defense budget than China, their global market share is still higher than China at 7%. Having said that, we believe the potential for arms export cannot be underestimated, and such growth will prove to be beneficial to the listed companies in the aerospace and defense industry.

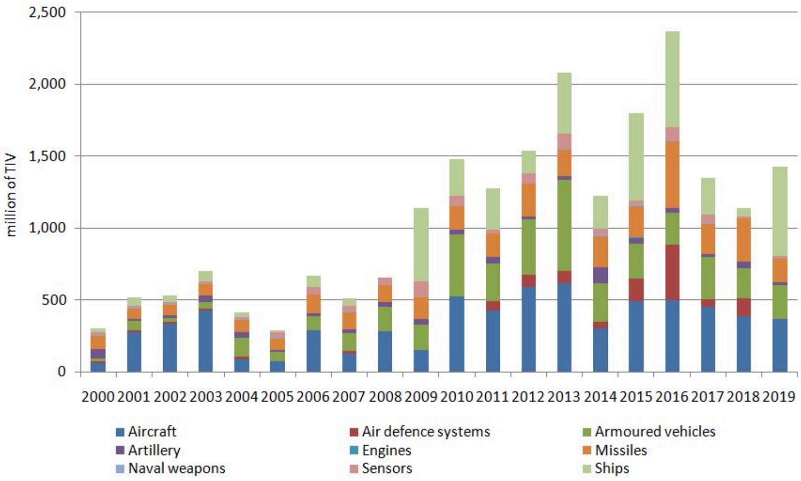
Figure 17: Global market share of arms export (2014-2018)



Source: SIPRI

The breakdown of China's arms export by weapon type shows the key products that China has been exporting over the last 20 years. The top three types are: 1.) aircraft, 2.) ships and 3.) armoured vehicles, which accounted for 31.5%, 20.9% and 19.2%, respectively (Figure 18). In our view, these are the areas that China enjoy competitive advantages based on its research and manufacturing capability and they will be the focuses for the aerospace and defense industry.

Figure 18: China's arms export by weapon type



Source: SIPRI

4. Increase in civilian use of defense technology. Another key driver for the aerospace and defense sector is the increase in the civilian use of defense related technology and products. The government has long been supportive towards such commercialisation. Early in 1992, the State Council has already published the Notice on Recommendation to Promote the Transfer of Defense Technology to Civilian Use to Support the Economic Development of Coastal Area. The Notice encourages the co-operations between different government departments, financial institutions and private sector in promoting the use of defense related technology on civilian product development and export. This has effectively kicked-started an increasingly large scale of the civilian use of defense technology.

Every year, the Ministry of Industry and Information Technology publishes the “Promotion catalogue for Civilian Use of Military Technology". In the latest catalogue in 2018, there are a total of 150 products and services in six broad areas including advanced materials, intelligent manufacturing, hi-end equipment, new era information technology, new energy and environmental protection, and emergency rescue and public safety. The 2019 catalogue is expected to be published soon with the information solicitation covers five major areas (Figure 19).

Figure 19: Key areas to be covered in the 2019 military-to-civilian use catalogue

Category	Details
Advanced materials	Various types of advanced metal materials, composite materials, inorganic non-metallic materials, high-performance structural materials, aerospace and aviation special materials, electronic information materials, nano materials, composite materials, and related technologies and products required for the design, preparation and application of various advanced materials.
High-end technical equipment	All kinds of high-end technical equipment in civil aerospace, civil aviation, high-tech ships, metro transit, medical treatment, special manufacturing, as well as core key supporting parts, inspection and testing equipment, etc.
Electronic information	New generation network equipment, optical transmission equipment, communication equipment, special computers and external equipment, network information security products and systems, new display devices, electronic components, consumer electronics, special electronic equipment, and Beidou navigation systems, artificial intelligence, remote sensing detection, sensing, testing, digital simulation and other application technologies and hardware and software products.
Energy & power technology	New energy technologies and products such as wind energy and solar energy; new energy storage devices and products such as low cost, green and environmental protective and high energy density batteries; various energy-saving technologies and products; various types of new power generation, conversion, distribution, management technologies and products.
Environmental protection technology	Atmospheric, water and other pollution prevention and control related detection and control technologies and products; various medical, production, and domestic waste automatic sorting and processing devices; various pollutant discharge comprehensive treatment devices and systems.

Source: Ministry of Industry and Information Technology

Historically, most of the downstream customers of defense enterprises are military procurement and their spending is limited by the defense budget. This has led to limited profitability of many of these enterprises. In addition, the high sensitivity of the defense technology has laid many obstacles on the road to commercialisation. However, with the general increase in use of advanced technology across different civilian areas over the last few years, the adoption of defense technology in daily use is getting much more appealing to the defense enterprises. Such development is positive to the aerospace and defense companies as their market and business opportunities will see sharp expansion going forward.

5. Potential for asset restructuring. Among the 30 largest A-share sectors by market capitalisation, aerospace and defense sector is ranked as 26th in terms of ROE at 1.8%, the low end of the -1.2% to 20.1% range for its A-share peers (Figure 20). We believe the low financial efficiency of the sector stems from poor profitability, but not the leverage level. In fact, the sector's ROA of 0.9% is ranked as the 62th lowest of the 65 A-share sectors under the classification by *Wind*. And because of this reason, there is a lot of room for improvement in its ROE through asset restructuring, in our view.

Figure 20: Comparison of ROEs of the 30 largest A-share sectors

ROE Rank	Industry	PE-TTM	ROE-TTM(%)	Market cap. (Rmb bn)
1	Liquor	35.9	20.1%	3,161.1
2	Agriculture	21.1	18.3%	1,243.4
3	Insurance	11.2	15.6%	2,801.9
4	Construction materials	15.1	14.1%	1,062.4
5	Household appliance	24.0	12.2%	1,366.8
6	Real estate	9.6	12.2%	2,101.8
7	Food	49.2	11.5%	1,432.7
8	Bank	5.9	10.8%	9,945.5
9	Biotech	81.0	9.3%	1,354.4
10	Construction	9.4	8.9%	1,383.3
11	Heavy machinery	22.6	8.0%	810.3
12	Healthcare	60.3	7.7%	1,438.6
13	Land transportation	24.1	7.4%	942.9
14	Electronic component and equipment	45.9	6.7%	3,417.4
15	Pharmaceuticals	55.4	6.5%	2,991.1
16	Power	18.8	6.4%	1,527.3
17	Power construction and network	48.1	6.0%	1,828.5
18	Securities companies	27.0	6.0%	2,804.4
19	Chemicals	34.5	5.6%	1,074.7
20	Semiconductors	115.3	5.4%	1,955.8
21	Retail	35.7	4.6%	946.1
22	Communication equipment	90.4	4.4%	1,211.2
23	Industrial equipment	56.8	4.3%	1,675.3
24	Auto parts	55.4	3.9%	870.9
25	Oil & gas	32.5	2.3%	1,507.0
26	***Aerospace and defense***	***148.8***	***1.8%***	***818.5***
27	Software	426.1	1.6%	2,327.6
28	Basic materials	168.8	1.0%	1,242.8
29	Internet	-520.0	-0.8%	1,118.4
30	Culture and media	-162.6	-1.2%	908.8

Source: Wind

Over the last five years, the government has actively pushed for the SOE reforms in order to improve their operating efficiency and profitability. According to the "Opinion on key tasks for deepening economic system reform in 2016" issued by the National Development and Reform Commission (NDRC), the State Council has encouraged mixed reforms and the whole group listing of major SOEs. Subsequently, many large SOEs have pursued whole group listing, for example Citic Ltd (267 HK). As for the aerospace and defense sector, we believe asset restructuring - including whole group listing, injection of quality commercial assets, disposal of non-core assets with low return and intra-group asset restructuring - are ways to streamline operations, optimise asset utilisation and enhance profitability.

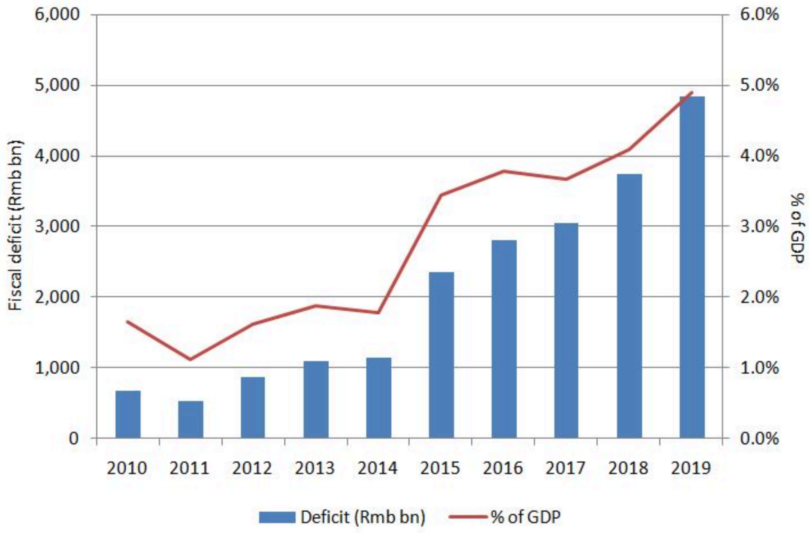
Another alternative to boost the sector economics is through M&As within the sector. Currently, there are seven central SOEs in the aerospace and defense industry and this list has not included the nuclear and shipbuilding SOEs which also involved in defense. In other words, almost 10% of the central SOEs (by count) are in the aerospace and defense sector, with over 70 listed companies. However, the aggregate market capitalisation of these listed companies is only ranked as 29th within the A-share sector, out of a total of 65.

We believe there are many opportunities to conduct M&As within the sector. Both the parent company group and the listed company levels have a lot of overlapping in business activities. A combination will allow for synergy through resources optimisation and improvement in asset utilisation. This can also raise efficiency through better headcount management and rationalising overhead to increase competitiveness. There are already previous high-level M&A cases including the formation of China State Shipbuilding Corporation Limited through the merger of the precedent China State Shipbuilding Corporation Limited and China Shipbuilding Industry Corporation Limited in 2019. Another example is the merger of CNR and CSR in 2015 to form CRRC Corporation Limited. M&A is a viable way to boost profitability of the sector and increase competitiveness as the aerospace and defense companies step up overseas expansion and pursue exports business. We believe potential asset restructuring is a good opportunity for the aerospace and defense A-share companies.

Risks

1. Government budget constraint to reduce defense spending. One of the downside risks for the sector is the fiscal constraint of the Chinese government. The government's fiscal deficit amounted to Rmb4.8trn in 2019, representing 4.9% of GDP (Figure 21). With the Covid-19 outbreak in this year, the increase in fiscal measures to stimulate the economy and the slowdown in GDP will be a double whammy to the budget deficit.

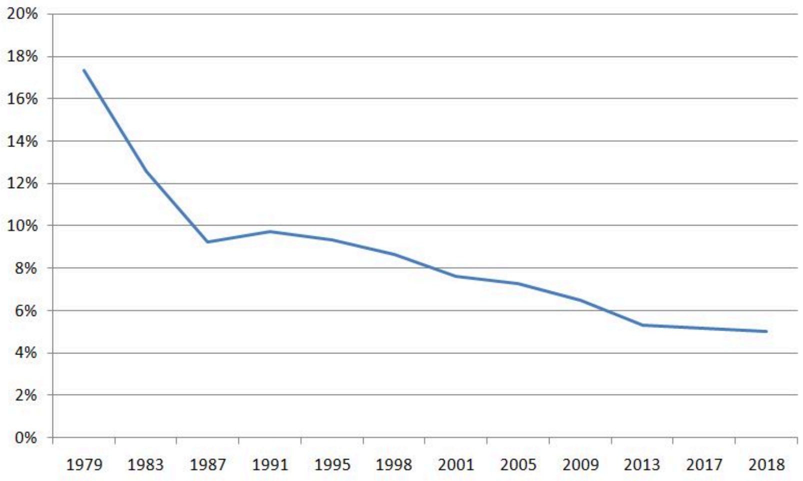
Figure 21: Fiscal deficit as a percentage of GDP



Source: NBS

We believe there is potential pressure for the government to increase control in spending in selective defense areas during the tough economic environment.The government's defense spending as a percentage of government spending has continuously declined in the last 40 years - from 17.4% in 1979 to an estimate of 5.0% in 2018 (Figure 22). Despite so, we cannot rule out the possibility for China's defense spending to see further slowdown in the future. However, given the strategic significance of defense spending amid the uprising of US-China political tension, we see a defense spending cut as an extremely low likelihood event.

Figure 22: Defense spending as a percentage of government spending

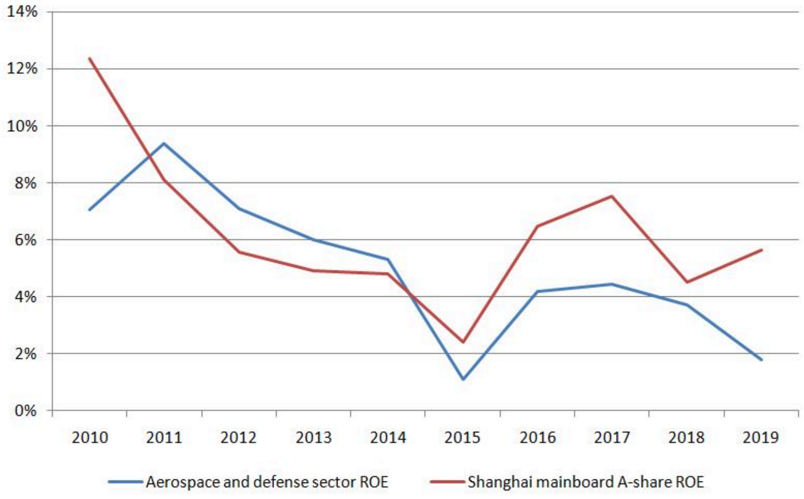


Source: White Paper on China's Defense in the New Era, NBS

2. Restructuring may not benefit listcos in the short term. While the potential for industry restructuring will open new opportunities for the listed companies, such exercises may not benefit the profitability of the listed companies in the short term. This is partly due to the fact that many of the potential injected assets are having a longstanding position as wholly-owned SOEs or the government's research institutes which are not profit-oriented.

Compared with other sectors in the A-share market, the aerospace and defense sector is a less commercialised sector mainly due to their high sensitivity. As a result, the sector has low ROEs and ROAs - 1.8% and 0.9%, respectively, for FY19, and they have been trending down over the last ten years but have more or less stabilised since FY15 (Figure 23). However, over the longer term, we believe the need to increase the ability for the stock market as a funding source for future expansion and increase in commercialisation of the industry, there is room for their profitability to improve.

Figure 23: Average ROE of the aerospace and defense sector relative to A-share market



Source: Wind

3. External "interventions" into China's defense strategy and spending. Given the increase in China's political, economic and military strengths over the years, China's defense strategy has attracted increased attention globally. US and the EU have their own intelligence systems to monitor China's defense strategy, military expansion and arms investment. For example, the National Defense Authorization Act of the US provides that the US Secretary of Defense shall submit an annual report in both classified and unclassified form, on military and security developments involving the People’s Republic of China (Figure 24). Specifically, the report shall address the current and probable future course of military-technological development of the PLA and the tenets and probable development of Chinese security strategy and military strategy, and of the military organisations and operational concepts supporting such development over the next 20 years. The report shall also address US-China engagement and cooperation on security matters during the period covered by the report, including through US-China military-to-military contacts, and the US strategy for such engagement and cooperation in the future.

Figure 24: Annual Report to Congress - Military and Security Developments - PRC 2019

ANNUAL REPORT
TO CONGRESS

Military and Security Developments
Involving the People's Republic of China 2019

Office of the Secretary of Defense

Preparation of this report cost the Department of Defense a total of approximately $181,000 in Fiscal Years 2018-2019. This includes $12,000 in expenses and $169,000 in DoD labor.

Generated on 2019May02 RefID: E-1F4B924

Source: US Department of Defense

In numerous cases, many of the findings of these intelligence services have raised concerns on the impact on global political stability from China's military strategy, putting external pressure on China's defense spending. Despite so, we do not expect these external "interventions" to have an determining factor on China's defense spending. However, we believe the country will take them into consideration when drafting its defense strategy and plan, especially given the heightened political relation between US and China. As such, this is a factor, albeit a quite remote one, that may potentially affect the growth of aerospace and defense sector in China.

Key aerospace and defense central SOEs in China

China Aerospace Science and Technology Corporation (中国航天科技集团有限公司)

China Aerospace Science and Technology Corporation (CASC) was founded on 1 July, 1999. CASC is originated from the Fifth Research Academy of the Ministry of National Defense established in 1956 and experienced the historic evolution of the Seventh Ministry of Machinery Industry, the Ministry of Astronautics, the Ministry of Aerospace Industry, and China Aerospace Corporation.

CASC has 8 R&D and production complexes, 11 specialised companies and 13 listed companies. CASC is mainly engaged in the research, design, manufacture, test and launch of space products such as launch vehicle, satellite, manned spaceship, cargo spaceship, deep space explorer and space station as well as strategic and tactical missile systems (Figure 25). CASC also develops space services such as satellite and its ground operation, international space commercial services, space financial investment, software and information services. CASC is now the only broadcast and communications satellite operator in China. CASC is currently carrying out major national scientific and technical programs such as Manned Spaceflight, Lunar Exploration, Beidou Navigation and High-Resolution Earth Observation System, The SOE is initiating a number of other new programs and projects including heavy launch vehicle, Mars exploration, asteroid exploration, space vehicle in-orbit service and maintenance, and space-ground integrated information network.

Figure 25: Key products and services of CASC

Space system (宇航产品)

Defense system (导弹武器)

Space Technology Application (航天技术应用)

Space Services (航天服务业)

Source: Company data

China Aerospace Science and Industry Corporation (中国航天科工集团有限公司)

CASIC 中国航天科工集团有限公司
CHINA AEROSPACE SCIENCE AND INDUSTRY CORPORATION

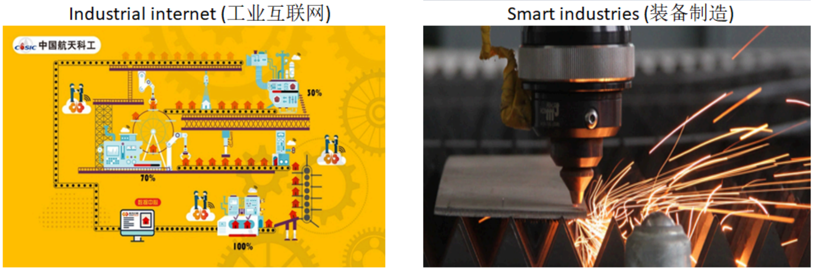
China Aerospace Science and Industry Corporation (CASIC) is formerly known as the Fifth Research Academy of the Ministry of National Defense established in October 1956. It was evolved from historical institutions, ministries and enterprises including the Seventh Ministry of Machine Building (the Eighth Ministry of Machine Building was incorporated into the Seventh Ministry of Machine Building in Sep 1981), the Ministry of Aerospace Industry, the Ministry of Aviation and Aerospace Industry, China Aerospace Corporation, and China Aerospace Science and Industry Corporation.

CASIC currently has 6 research institutes, 17 wholly-owned or controlling companies and subordinate units. Also, there are more than 500 other enterprises and institutions of CASIC in China. CASIC's products include technology R&D and production system for air defense missile weapon system, aerodynamic missile weapon system, solid launch vehicle and space technology products (Figure 26). More than 10 types of CASIC's missile weapons and support equipment have participated in the military parade for the 70th anniversary of the victory of the Anti-Japanese War and the military parade held to mark the 90th anniversary of the PLA. CASIC has implemented the “Five Clouds and One Train” (Feiyun, Kuaiyun, Xingyun, Hongyun and Tengyun and high speed flying train) commercial aerospace projects.

Figure 26: Key products and services of CASIC

Aerospace defense (导弹武器装备)

Commercial aerospace (航天工程)



Industrial internet (工业互联网)

Smart industries (装备制造)

Source: Company data

Aviation Industry Corporation of China Ltd (中国航空工业集团有限公司)

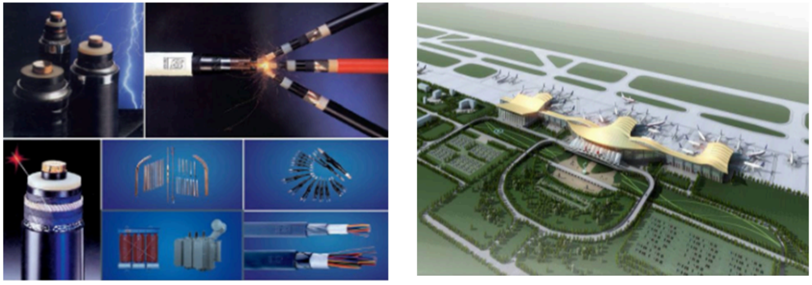
The Aviation Industry Corporation of China, Ltd. (AVIC) was founded on 6 Nov, 2008 through the restructuring and consolidation of the China Aviation Industry Corporation I (AVIC I) and the China Aviation Industry Corporation II (AVIC II). AVIC's business units cover defense, transport aircrafts, helicopters, avionics and systems, general aviation, R&D, flight testing, trade and logistics, assets management, finance services, engineering and construction, automobiles and more. AVIC has over 100 subsidiaries and 25 listed companies.

AVIC is the Tier I supplier of ARJ-21 and C919 aircrafts and produces parts and components for aircraft manufacturers worldwide. Its export products include the regional turboprop MA60 series, Y12s and the AC series helicopters. AVIC has integrated aviation science and technology into automobile components and parts, LCD, PCB, EO connectors, Lithium power battery, intelligent device etc (Figure 27). In addition, AVIC provides other services including aircraft leasing, general aviation, transportation, planning and construction and etc. It also engages in civil engineering projects such as airport construction, power plant construction, rail transportation, highway bridges, vocational education, mobile hospital, power generating, etc.

Figure 27: Key products and services of AVIC

Military aviation & defense (军用航空与防务)

Civil aviation (民用航空)



General manufacturing (工业制造)

Modern services (现代服务)

Source: Company data

China North Industries Group Corporation Limited (中国兵器工业集团有限公司)

China North Industries Group Corporation Limited (NORINCO) is the main platform responsible for developing equipment for PLA including destructive-attack devices and acts as a major center for R&D and manufacture of modernised new-generation army systemic equipment.

NORINCO is the only major military industry group that is capable of providing weapons and technical support services to the PLA army, navy, air force, rocket force, strategic support force, as well as armed police & public security unit. In addition to tanks and armored vehicles, long-range suppression weapons, air defense and anti-missile and other main battle equipment, NORINCO also provides strategic and basic products, such as intelligent ammunition, photoelectric information and damage technology, to various branches of the PLA (Figure 28).

NORINCO engages in the commercialization and industrialisation of military technology, with key sector focuses including auto parts, engineering machinery and equipment, railway products, petrochemical, special chemical, civil explosion, photoelectric information, Beidou application, intelligent manufacturing, as well as modern service sectors such as trade circulation, engineering technology management, and financial services. Currently NORINCO has more than 50 sub-groups and directly-managed entities. It also has more than 100 overseas branches & subsidiaries and representative offices in over 70 countries and regions in the world.

Figure 28: Key products and services of NORINCO

Defense products (装备保障)

Strategic resources (战略资源)

Heavy duty equipment (工业制造)

Opto-electronic IT (光电信息)

Source: Company data

China South Industries Group Co Limited (中国兵器装备集团有限公司)

中国兵器装备集团有限公司
CHINA SOUTH INDUSTRIES GROUP CO., LTD.

China South Industries Group Corporation (CSGC) is founded in July 1999. It owns more than 50 enterprises and R&D organisations such as Changan Automobile Group, Tianwei Group, Jialing and Jianshe, has more than 30 production bases and marketing networks in the world. CSGC is organised into four industrial blocks, namely special products, vehicles, new energy and equipment manufacturing (Figure 29). The special products are equipped on all armaments in China and plays an important role in national defense.

Also as a vehicle enterprise group with the widest production bases in China, CSGC owns 9 production bases, 23 vehicle assembly factories and 27 enterprises in China and has overseas bases in Malaysia, Vietnam, Iran and Ukraine, with annual production capacity of over 2.6m vehicles. CSGC is the largest motorcycle group in the world and has famous brands such as Jialing, Jianshe, Dayang and Qingqi, with the annual production capacity of nearly 6m sets. It also has a market share of over 10% in large transformer and is a leader in the field of ultra high voltage transformer technology internationally.

Figure 29: Key products and services of CSGC

Special equipment (特种装备)

Equipment manufacturing (装备制造)

Vehicle (汽车)

Motorcycle (摩托车)

Source: Company data

China Electronics Technology Group Corporation (中国电子科技集团有限公司)

CETC 中国电子科技集团有限公司
CHINA ELECTRONICS TECHNOLOGY GROUP CORPORATION

China Electronic Technology Group Corporation (CETC) was officially established in 1 Mar, 2002. It is has 8 listed companies, 42 subsidiaries and over 40 offices overseas. In China, CETC has 18 national key laboratories and10 national research centers and innovation centers.

CETC is a central SOE in the fields of defense electronics, security electronics and informatisation with its market covering more than 110 countries and regions in the world. Its defense electronics business has seven main products systems (Figure 30) - air base early warning, integrated electronic information system, radar, communication and navigation, electronic warfare, UAV electronic equipment and integrated Identification Friend or Foe (IFF). Its security electronics and information business includes products and businesses for public security, e-government, intelligent transportation, new energy and components.

Figure 30: Key products and services of CETC

Public safety & network security
(公共安全与网络信息安全)
Software and IT services
(软件与信息服务)
Communication network and GPS
(通信网络与导航)
Sensors and sensing network
(传感器与传感网络)

Source: Company data

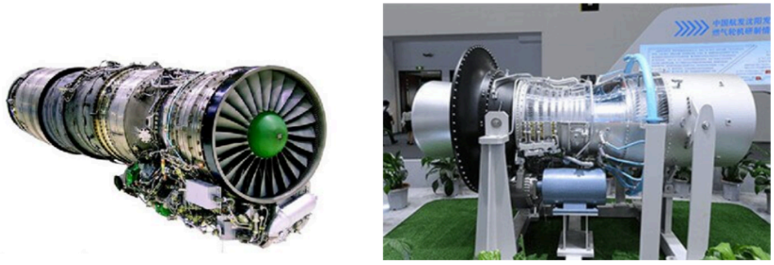
Aero Engine Corporation of China (中国航空发动机集团有限公司)

Aero Engine Corporation of China (AECC) has 27 directly affiliated enterprises and institutions and 3 listed companies. AECC operates key national defense science and technology laboratories and innovation centers involved in the R&D and manufacturing system for military and civil aviation engines and gas turbines.

AECC mainly engaged in the development, production, maintenance and service of aero-engine, auxiliary power, gas turbine, aircraft and helicopter transmission system and the development and manufacturing of aviation materials and other advanced materials. AVIC designs and produces turbojet, turbofan, turboshaft, turboprop, piston engine and gas turbine that are used in all kinds of civil and military aircrafts, helicopters, large ships, small and medium-sized generator sets (Figure 31).

Figure 31: Key products and services of AECC

Aviation engines (航空发动机)　　Gas turbine (燃气轮机)



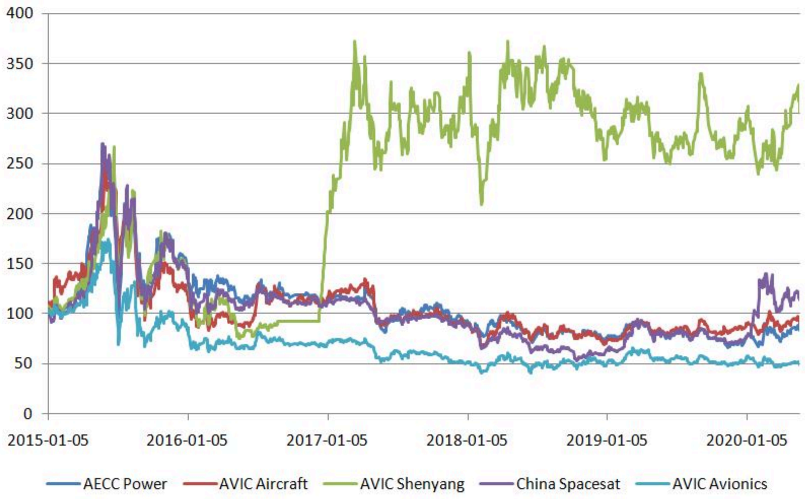
Transmission system (传动系统)　　Turbine disk (涡轮盘)

Source: Company data

Relative valuation

Share prices of the five MSCI China aerospace and defense A-share companies covered in this Smartkarma Original have generally had mediocre performance in the last five years, with Avic Shenyang Aircraft (600760 CH) (AVIC Shenyang) and China Spacesat Co Ltd A (600118 CH) (China Spacesat) recorded positive return while Avic Aircraft Co Ltd A (000768 CH) (AVIC Aircraft), AECC Aviation Power (600893 CH) (AECC Power) and China Avionics Systems Co (600372 CH) (AVIC Avionics) negative, partly due to the over-optimistic expectations of the sector that built up before 2015. However, after a long 3-4 years of correction, since 2019, performance of the sector has picked up on improved earnings and restructuring prospects, with average return amounted to 30.3% till now (Figure 32). As for AVIC Shenyang, the sharp surge in share price in 2017 is due to injection of AVIC's 100% ownership in Aviation Industry Shenyang Aircraft Industry (Group) Co., Ltd. into the company and turned it into a comprehensive military aircraft manufacturing arm of AVIC. This shows that good asset injections is an important theme for the sector.

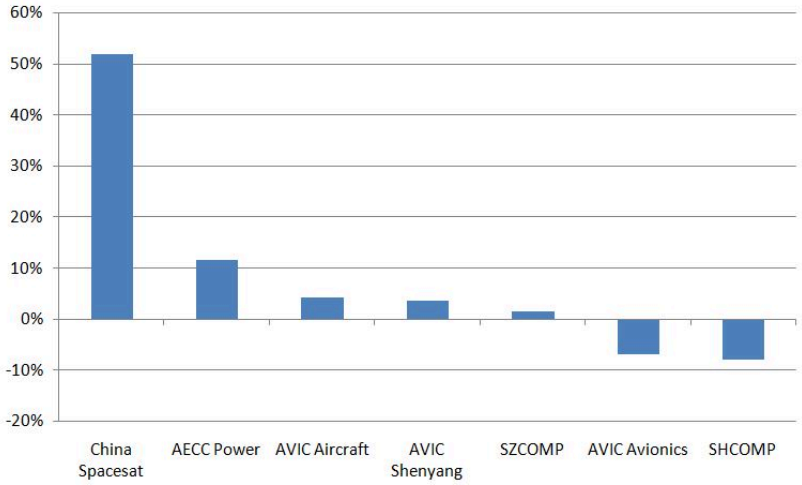
Figure 32: Relative performance of aerospace and defense stocks (Rebased 2015/1/1 = 100)



Source: Eastmoney Choice

Unlike consumer products, demand for the aerospace and defense sector products are less affected by the COVID-19 outbreak. As a result, the share price performance of these five companies is more resilient than that for many other A-share sectors. And except AVIC Avionics, YTD, the remaining four stocks have all outperformed the Shanghai Composite - by an average of 25.7pp and the Shenzhen Composite by 24.7pp (Figure 33).

Figure 33: YTD performance of aerospace and defense stocks vs. market indexes

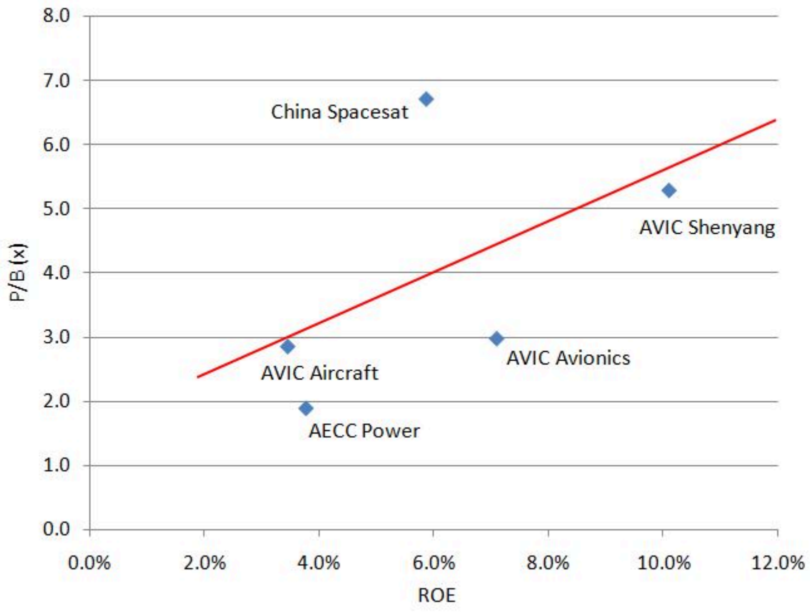


Source: Eastmoney Choice

We compare their P/B vs. ROE ratios to assess the valuation of individual stock relative to its peers. China Spacesat looks particularly overvalued relative to it ROE as it lies above the industry regression line (Figure 34).

This is understandable as it is the best-performing stock in the sector since 2019. Trading at a P/B of 6.7x with an ROE of 5.9%, we believe a lot of positive expectations have been imputed in the share price. In our view, AVIC Shenyang and AECC Power look more attractive at their current P/B multiples given their ROE outlook.

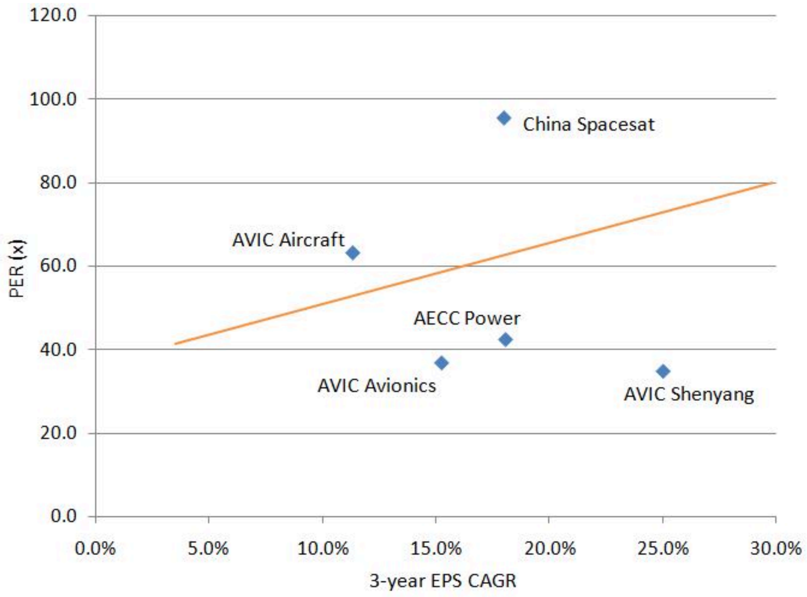
Figure 34: Relative valuation - P/B vs. ROE



Source: Eastmoney Choice

From a PEG perspective, the pattern looks very similar to the P/B vs. ROE ratios, with China Spacesat still appears on the expensive end. At the same time, AECC Power and AVIC Avionics look to be fair to slightly undervalued. However, the one that really stands out is AVIC Shenyang - trading at 34.9x FY20F, the stock is expected to generate a 3-year EPS growth of 25%, the highest within the sector (Figure 35).

Figure 35: Relative valuation - FY20F PER vs. 3-year CAGR (2019A-2022F) Growth



Source: Eastmoney Choice

Stocks ranked

1. AVIC Shenyang Aircraft (中航沈飞, 600760 CH)

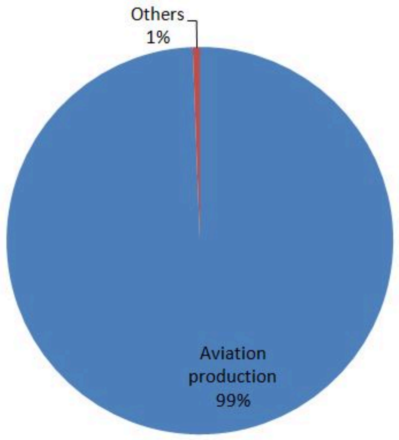
We believe Avic Shenyang Aircraft (600760 CH) (AVIC Shenyang) is best positioned to capture the growth opportunities in China's aerospace and defense industry given its unique status as the major listed platform for the country's combat aircraft research, development and manufacturing. AVIC Shenyang will benefit from the plans of PLAAF and PLA Naval Air Force (PLANAL) to upgrade their aircraft fleet and the rise in demand for carrier-based combat aircrafts as China expands its aircraft carrier fleet. Its pure business mix, with focus on aviation manufacturing, also ranks it better than some other companies in the sector which have many non-defense related businesses.

1.1 Background

AVIC Shenyang mainly engages in aviation product manufacturing, including aircraft, parts and components. In 2017, AVIC injected a 100% ownership in Aviation Industry Shenyang Aircraft Industry (Group) Co., Ltd. (ASAIC) into AVIC Shenyang, turning the company into the only major listed company in combat aircraft manufacturing in China. At the end of 2019, AVIC Shenyang is 70.04% owned by AVIC.

AVIC Shenyang has strong research, production, testing, test flight and servicing capability related to aircraft manufacturing. Its key businesses include military and civil aircraft production, industrial manufacturing and aircraft repair and maintenance. The company has a simple earnings profile as aviation production accounted for the bulk of its revenue and profit in FY19 - 99% of its revenue and profit are from this business (Figure 36).

Figure 36: FY19 profit breakdown

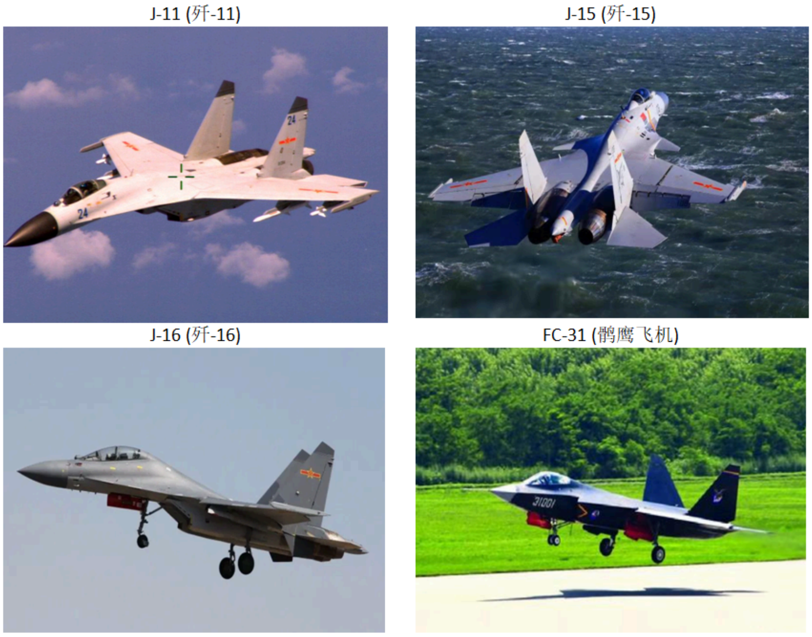


Source: Company data

1.2 Investment thesis

Only major listed platform for combat aircraft production in China. After the injection of ASAIC into AVIC Shenyang in 2017, the company has turned into the only major listed platform for research and production of combat aircraft in China. Its key existing military aircraft products include mainstream fighters like J-11 (歼-11战机), J-15 (歼-15战机) and J-16 (歼-16战机) (Figure 37). In the meantime, the company is in active development of new products including FC-31 (鹘鹰飞机) and Anjian (暗剑无人机) unmanned aerial vehicle (UAV).

Figure 37: Major combat aircrafts of AVIC Shenyang

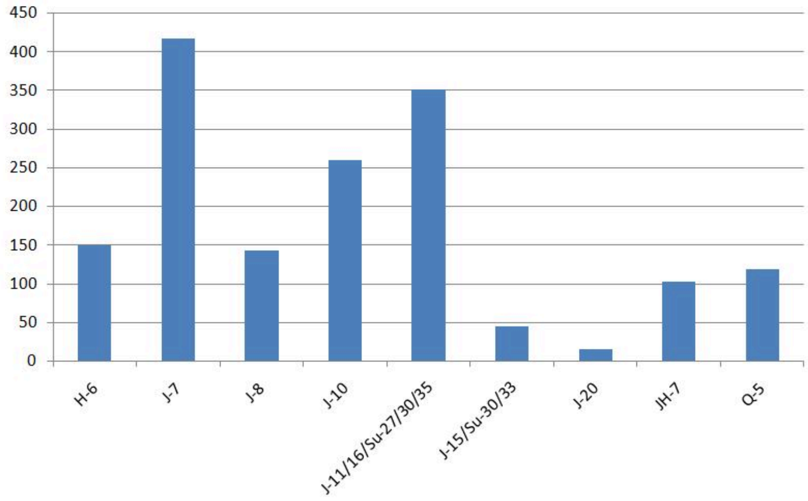


Source: Company data

AVIC Shenyang, through its subsidiary ASAIC, has a long history of developing, assembling and manufacturing combat aircraft in China. The company started off with the production of J-5 fighter in 1956 and has accumulated over 60 years of experience in the industry. The combat aircraft development and production industry in China is a duopoly with AVIC Shenyang and the unlisted AVIC Chengdu Aircraft Industrial (Group) Co., Ltd (AVIC Chengdu), both owned by AVIC, as the main players. However, there is limited competition between these two companies as AVIC Chengdu is focused on J-10 (歼-10战机) , J-20 (歼-20战机) and FC-1 (枭龙战斗机). In terms of product scope, AVIC Shenyang has a wider spectrum and many new projects are currently under its development. Given its industry experience and the competitive landscape, AVIC Shenyang is well positioned to capture the growth opportunities in the potential expansion and fleet upgrade of the PLAAF and PLANAF.

Solid demand driven by J-15 and J-16. The current active combat aircraft fleet of the PLAAF and PLANAF are mainly composed of, by international classification, third generation fighter (J-7 and J-8) and fourth generation (J-10 and J-11) that are developed before 2000 (Figure 38). With the need to increase the PLAAF and PLANAF combat capability, there is increasingly more imminent need to upgrade their existing fleet of combat aircrafts.

Figure 38: China's fleet of active combat aircraft



Note: Include both PLAAF and PLANAF. Source: World Air Forces 2020

J-15 and J-16 have improved combat capability when compared with J-10 and J-11 (Figure 39). These fighters continue to build on multi-role capability equipped with increasingly sophisticated avionics and weapon systems. They emphasize maneuverability rather than speed to succeed in air-to-air combat, and have more sophisticated avionics, engines, and are able to operate more capable missiles. Other notable fighters comparable to J-15 and J-16 include F-14, F-15, F-16 of the US and Su-27/30/33/35 and MiG-29/35 of Russia.

Figure 39: Comparison of J-10, J-11, J-15 and J-16

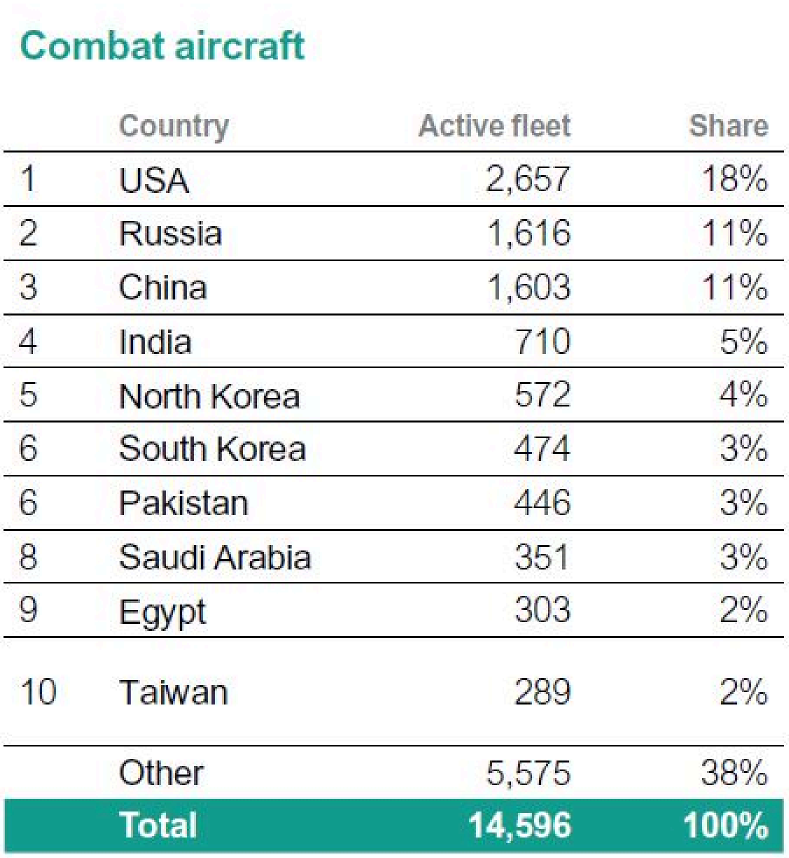
Specifications	J-10	J-11	J-15	J-16
Length (m)	16.4	21.9	21.9	21.9
Wingspan (m)	9.8	14.7	14.7	14.7
Height (m)	5.4	5.92	5.90	6.4
Wing area (sqm)	33.0	52.8	62.0	62.0
Empty weight (kg)	9,750	16,870	17,500	17,700
Gross weight (kg)	12,400	23,926	27,000	26,000
Max takeoff weight (kg)	19,277	33,000	33,000	35,000
Max speed (km/h)	2,176	2,500	2,940	2,940
Ferry range (km)	3,200	3,530	3,500	4,500
Service ceiling (m)	18,000	19,000	20,000	20,000
Manufacturer (AVIC)	Chengdu	Shenyang	Shenyang	Shenyang

Source: Company data, ArmedForce, Wikipedia, militaryfactory.com

J-15 is currently the main combat aircraft on China's aircraft carriers. China's two existing aircraft carriers - *Liaoning* and *Shandong* - each carries 36 J-15 fighters, along with other anti-submarine warfare helicopters, airborne early warning helicopters and rescue helicopters. Due to the high sensitivity and confidentiality, there is limited availability for information of China's aircraft carrier development plan. However, based on various media reports, construction of the country's third aircraft carrier is currently taking place. If we assume a similar 36 x J-15 fighters for the new carrier, and based on the estimated price tag of ~Rmb400m each, this will mean a significant revenue of Rmb14bn for AVIC Shenyang.

In addition, in order to narrow down the gap between the combat capability of the US and China Air Forces, there is demand from combat aircraft fleet expansion. Based on the number of combat aircraft, China is only ranked third globally with a 11% share, and this compared with US as the first with an 18% share and Russia as the second at a similar 11% share (Figure 40). In terms of the active fleet size, China is only 60% that of the US. Such discrepancy looks significant and this underpins the need for China to beef up its active combat aircraft fleet. We believe such potential fleet expansion will drive the demand for the mainstream products of AVIC Shenyang, supporting its growth outlook.

Figure 40: Fleet size of combat aircraft by leading countries



Combat aircraft

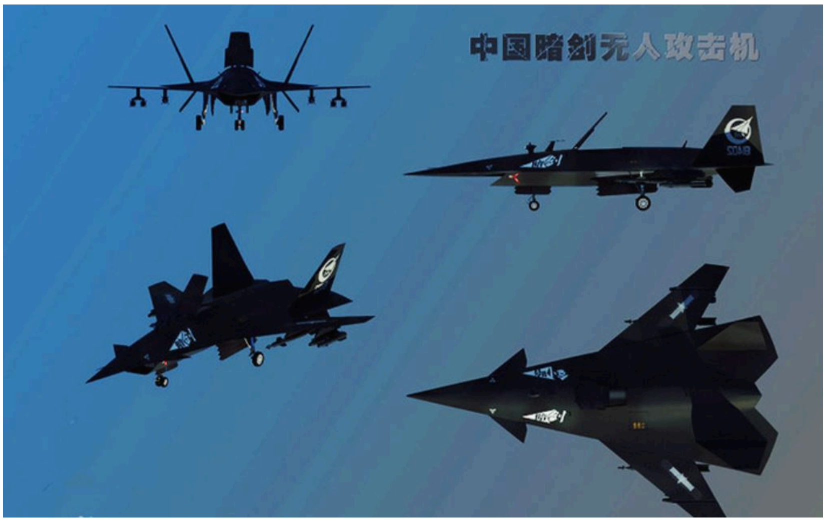
	Country	Active fleet	Share
1	USA	2,657	18%
2	Russia	1,616	11%
3	China	1,603	11%
4	India	710	5%
5	North Korea	572	4%
6	South Korea	474	3%
6	Pakistan	446	3%
8	Saudi Arabia	351	3%
9	Egypt	303	2%
10	Taiwan	289	2%
	Other	5,575	38%
	Total	**14,596**	**100%**

Source: World Air Forces 2020

New product pipeline to boost outlook. AVIC Shenyang has many new products currently in its pipeline and they are the potential boost to its earnings prospects. The company is in advance progress on the development of FC-31 fighter, a twin-engine, mid-sized fifth-generation fighter. FC-31 is expected to be either a carrier-based multi-role fighter for China or solely for export purpose. It is believed that the combat capability will be ahead of the US F-15 fighter once it enter services. The strength of FC-31 lies in its low radar detectability and low infrared radiation features and it is claimed that additive manufacturing was extensively used, leading to a 50% reduction in components compared to similar aircraft. The current estimated price tag for FC-31 is about US$70m, only slightly higher than US$60m for J-15, suggesting good value proposition relative to its pricing.

Anjian UAV (暗剑无人机) is another product that AVIC Shenyang is currently developing (Figure 41). The Anjian UAV has supersonic speed, super high maneuverability and low detectability, and is mainly used for future air combat. According to various reports, the design of Anjian UAV is unique, and it is completely different from the current UAV development trend and the popular B-2 stealth bomber type UAV design, as it is likely to have air combat capabilities.

Figure 41: Anjian UAV

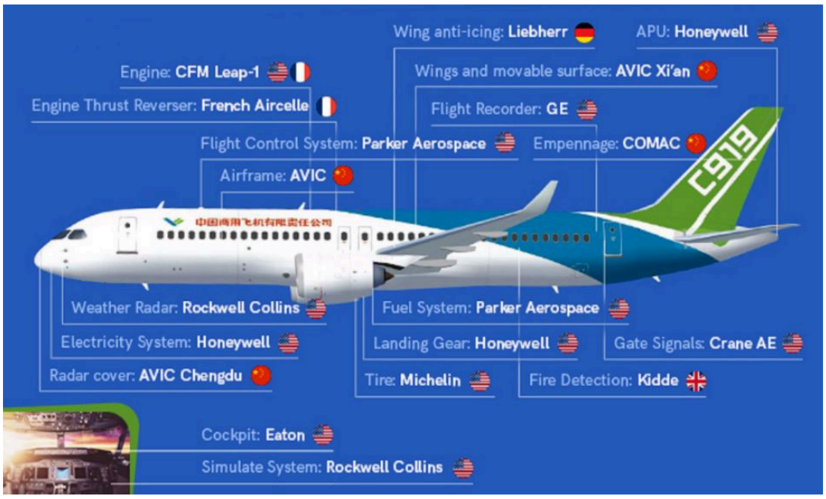


Source: www.baidu.com

Civil aircraft component supply added earnings contributor. Besides military aircrafts, AVIC Shenyang is actively involved in the supply of components to China's civil aircraft industry. It is the supplier of the empennage, power center, radio rack etc for AR-J21. AR-J21 is a 78–90 seat regional jet manufactured by COMAC, and has received positive market response. COMAC has delivered 24 ARJ-21 aircrafts so far, with about 330 outstanding orders. In Aug 2019, the Big Three Chinese airlines China Southern Airlines (1055 HK), Air China Ltd (H) (753 HK) and China Eastern Airlines Co (H) (670 HK) have each placed an order of 35 AR-J21.

AVIC Shenyang is also an important component supplier to China's C919 (Figure 42). It will supply rear fuselage, vertical tail, engine suspension, APU door etc to C919. C919 is narrow-body twinjet airliner developed by COMAC. Currently, there are over 800 orders for C919, and the maiden delivery is expected to be 2021. While the recent incident related to the LEAP engine sales to China has been resolved, this is a clear warning signal that there may be further obstacles on the final delivery of C919 due to constraints on engines and parts supplies. Nonetheless, we believe the development of C919 represents a structural development of China's localisation of aircraft production, instead of relying on Boeing Co (BA US) and Airbus Group SE (AIR FP), and a national priority. Its excellent long-term demand outlook is an important driver for AVIC Shenyang.

Figure 42: Key suppliers to C919

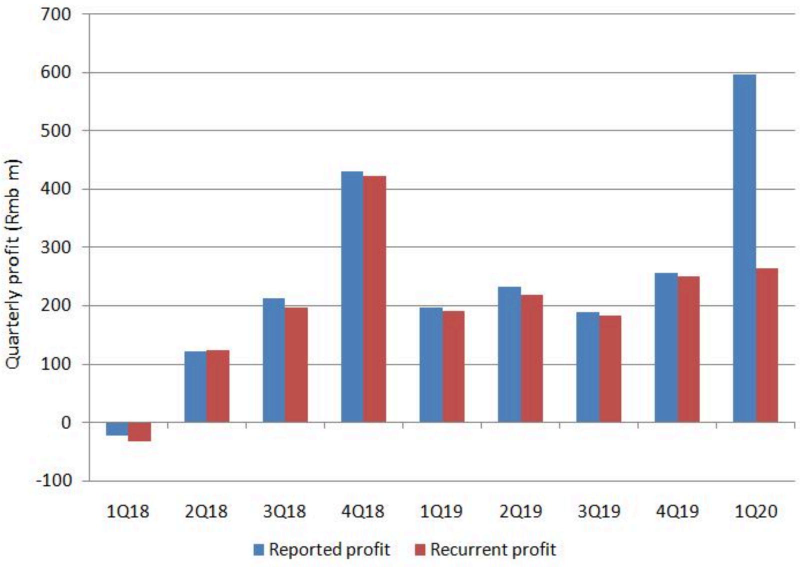

Wing anti-icing: **Liebherr**
APU: **Honeywell**
Engine: **CFM Leap-1**
Wings and movable surface: **AVIC Xi'an**
Engine Thrust Reverser: **French Aircelle**
Flight Recorder: **GE**
Flight Control System: **Parker Aerospace**
Empennage: **COMAC**
Airframe: **AVIC**
C919
中国商用飞机有限责任公司
Weather Radar: **Rockwell Collins**
Fuel System: **Parker Aerospace**
Electricity System: **Honeywell**
Landing Gear: **Honeywell**
Gate Signals: **Crane AE**
Radar cover: **AVIC Chengdu**
Tire: **Michelin**
Fire Detection: **Kidde**
Cockpit: **Eaton**
Simulate System: **Rockwell Collins**

Source: Aerotime

1.3 Earnings outlook

AVIC Shenyang reported a 201.6% YoY surge in its profit to Rmb598m in 1Q20, with its revenue increased by 12.1%. The strong growth is mostly driven by a significant increase in other income to Rmb395m, from Rmb8m a year ago, thanks to a sharp jump in government subsidies. Even excluding this, its recurrent earnings still increased by a solid 37.8% in the quarter. However, we will not read into the quarterly earnings too much given its business nature as revenue and profit booking is affected by the timing of product delivery. It is for this reason that AVIC Shenyang has historically displayed highly varied quarterly profit (Figure 43).

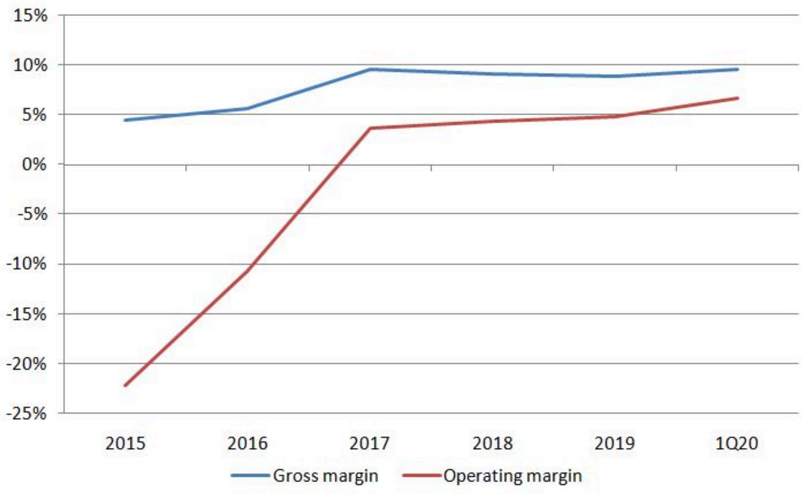
Figure 43: AVIC Shenyang - Quarterly profit



Source: Company data

AVIC Shenyang's earnings growth in the next two years will depend on the J-15 and J-16 fighters order momentum. According to *World Air Forces 2020*, the PLANAF has already made an order of 50 J-15. We believe the company will continue to see healthy revenue growth as driven by the fleet upgrades by PLAAF and PLANAF. Its gross margin was stable over the last three years but we see room for expansion as it delivers more high value and higher price products (Figure 44). In addition, it showed solid control in its operating costs, particularly in selling and management costs, which came down 70.1% and 23.5%, respectively, in the last two years, boosting operating margin by 3pp between 2017 and 1Q20. Further cost control achievement is likely to boost margin, though we believe the room to cut down selling costs is getting smaller now. Market consensus are forecasting a 25% EPS CAGR for 2019A-2022F (Figure 45), making AVIC Shenyang the company with the highest profit growth in the five aerospace and defense stocks covered in this Smartkarma Original.

Figure 44: Gross and operating margin



Source: Wind

Figure 45: Consensus earnings forecasts

Year end Dec	2018	2019	2020F	2021F	2022F
Reported profit (Rmb m)	743.24	877.79	1,314.08	1,454.21	1,719.43
% Change	5.16%	18.1%	49.7%	10.7%	18.2%
EPS (Rmb)	0.53	0.63	0.94	1.04	1.23
EPS Growth %	3.92%	18.9%	49.2%	10.6%	18.3%
PER (x)	62.1	52.2	34.9	31.6	26.8
ROE (%)	9.5%	10.1%	13.0%	12.6%	12.9%

Source: Wind

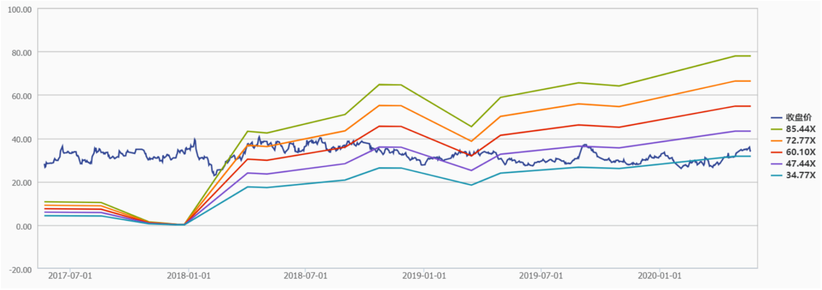
1.4 Key risks

The key risks for AVIC Shenyang are: 1.) slower than expected increase in fighter orders; 2.) shortage of key components due to supply disruptions; 3.) technical issues that affect the progress of new product development; and 4.) injection of less-profitable assets from the parent AVIC.

1.5 Valuation

AVIC Shenyang trades on 34.9x FY20F and 31.6x FY21F PER, which is at the low end of its historical range since 2018 (Figure 46). We think such valuations are not expensive given its strong earnings prospects and its unique position in the market as the only listed platform for combat aircraft manufacturing in China. When compared with its peers, AVIC Shenyang also has the best earnings growth. Lastly, we also consider its P/B multiple as undemanding relative to an ROE of 13% for FY20F. Its relative attractiveness in P/B and PER valuation to its peers is reflected in Figure 34 and Figure 35, respectively.

Figure 46: AVIC Shenyang - P/E band



Source: Wind

2. AECC Aviation Power (航发动力, 600893 CH)

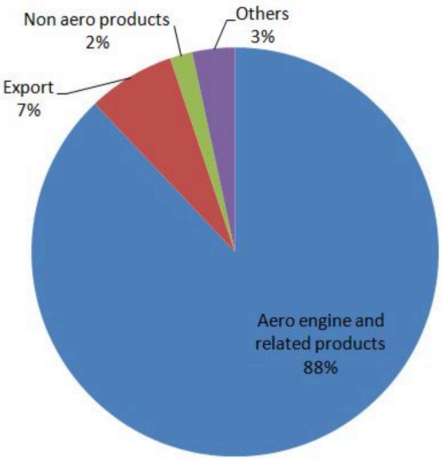
In our view, the strength of AECC Aviation Power (600893 CH) (AECC Power) lies its unique monopoly position in the aircraft engine research, development and production industry in China. AECC Power will benefit from the solid demand of engines driven by the rise in demand of both military and civilian aircraft in China and the structural trend of growing localisation of aircraft engine. With both AECC and AVIC as its key shareholders, it will receive strong supply from the government and is in an excellent position to ride on the demand growth.

2.1 Background

AECC Power is the production, development and repair base of China's large, medium and small military and civil aviation engines and large naval ship gas turbines. It is the largest, most powerful and most comprehensive power production enterprise with products include nearly all the models of China's aviation power equipment. Aero Engine Corporation of China (AECC) is the controlling shareholder of AECC Power, with a 15.59% direct stake and a 26.52% indirect stake through AECC Xian Aero-engine Ltd as at the end of 2019. AVIC also has a 10.89% direct stake in AECC Power.

AECC Power also engages in the subcontract production of foreign aviation components. It has entered into long-term strategic co-operation relations with General Electric Co (GE US), Rolls-Royce Holdings (RR/ LN), Safran SA (SAF FP) and Pratt & Whitney (PWC). It is the sole overseas supplier of nearly 100 different parts to several foreign engine manufacturing companies. In FY19, the company derived 88% of its profit from aero engine and related products (Figure 47).

Figure 47: FY19 profit breakdown



Source: Company data

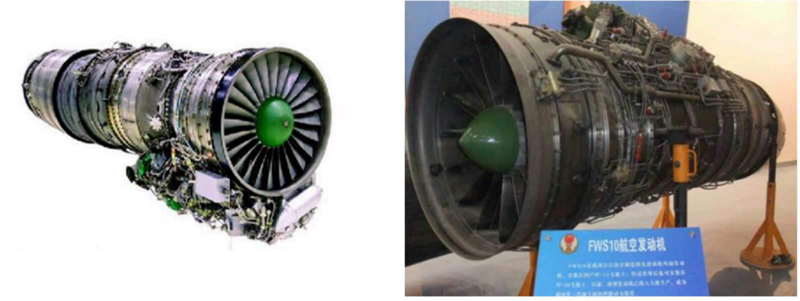
2.2 Investment thesis

Only listed company for aircraft engine research and production. AECC Power is the only listed company engaged in the research, development and production of engines for both military and civilian aircrafts in China. The company was established in 2017, but its key operating subsidiaries have experience in the development and production of aviation turbojet engine since 1954. AECC Power has very strong capability and numerous facilities for the manufacturing of all major types of aeroengine, including turbojet, turbofan, turboshaft, turboprop and piston (Figure 48).

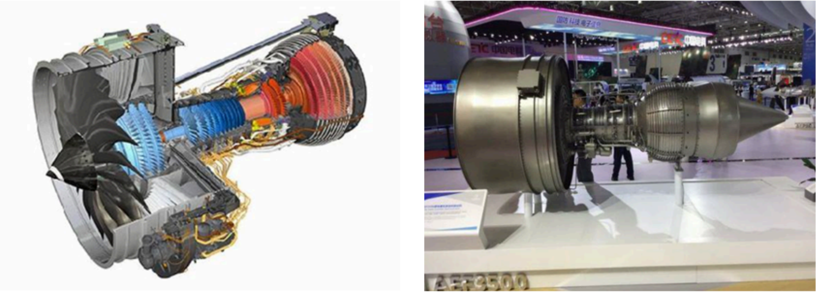
China basically centralises all of the aircraft engine development business under AECC Power's parent AECC, and AECC Power is its most important subsidiary. In 2005, AECC's subsidiary completed the development of the landmark turbofan WS-10 engine, which is a third generation aircraft engine and is now the mainstream product installed in major combat aircrafts in China. AECC Power is now in process to develop the next generation engine W-15, with the aim to close the gap with the products of major overseas competitors.

Figure 48: Major aircraft engine products of AECC Power

Kunlun engine WS-10 engine



CJ1000A engine AEF3500 engine

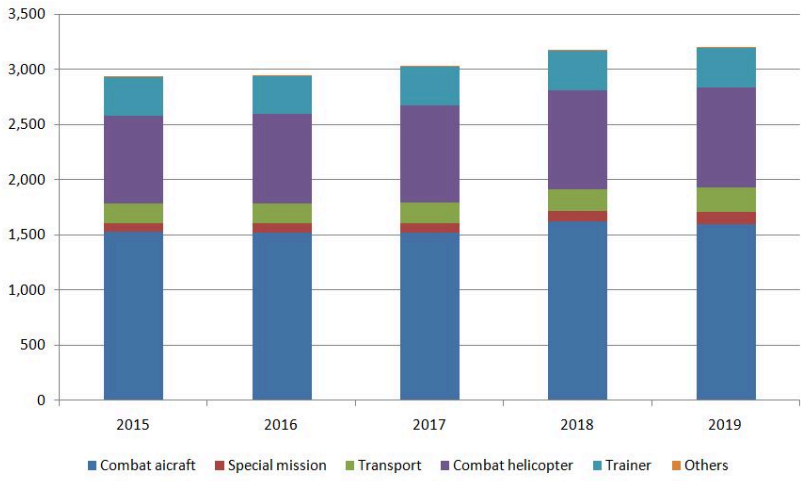


Source： Company data

Unlike the combat aircraft industry, the aeroengine industry in China is a monopolistic in nature with AECC Power as the only major player and received significant support from the government. Its shareholding structure, with AECC (and indirectly COMAC) and AVIC as its two largest shareholders, makes sure its competitive position in both the military and civilian aircraft engine market. AECC Power is currently proposing to acquire the minority shares of its three key subsidiaries by issuing new shares to these subsidiaries' current shareholders for a total consideration of Rmb8.4bn. Upon the completion, AECC Power will have a 100% ownership in these three subsidiaries. This will allow AECC Power to take the full benefits from the solid demand from the rapidly growing aviation engine markets in China in the future.

Demand from military aircraft underpin business outlook. We expect the growth in China's combat aircraft fleet to be a key stimulating factor for AECC Power's engine demand. AECC Power's engines have gradually replaced the Russian engines as China continues to boost the localisation of aircraft engines. The company's key engine product WS-10 and related versions have been installed in China's J-10, J-11 and J-16 fighters with good operating performance. Over the last five years, China's military aircraft fleet has increased by 12.3% (Figure 49), and with the growing trend to continue, this will be a key source of demand for AECC Power's engine products.

Figure 49: Growth in China's military aircraft fleet

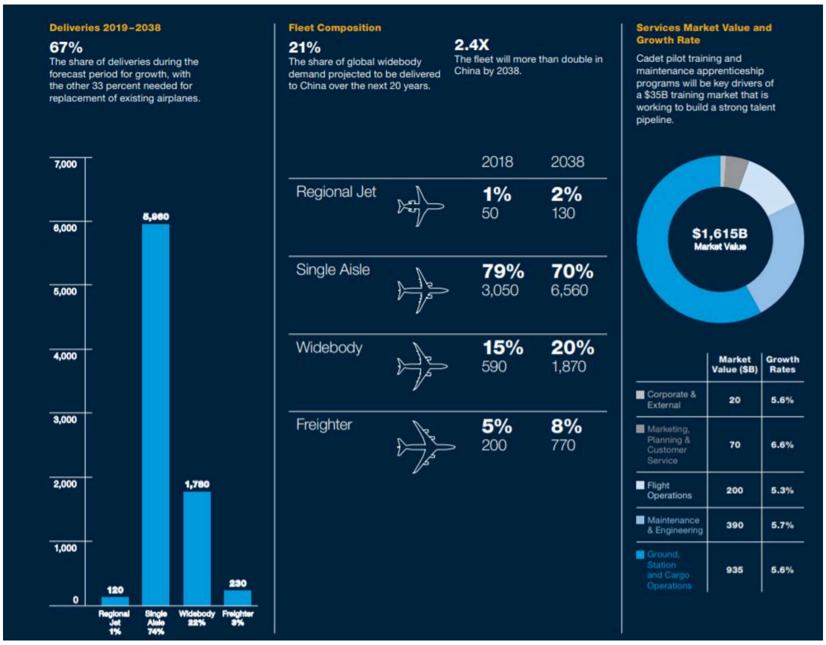


Source: World Air Forces 2020

Adding to this is the demand from upgrade of China's combat aircraft fleet. On average, price of engine amounted to 25-30% of the total price tag of an combat aircraft. Taking J-15 as an example, with a cost US$60m, the value of engine may amount to US$15-18m, translating into sizeable revenue stream for AECC Power. Given the move to fifth generation fighter as both PLAAF and PLANAF upgrade their fleet, there will be good derived demand for AECC Power's new generation engines. Further demand from the repair and maintenance services will represent an additional earnings stream.

Civilian aircrafts engine demand is another driver. According to Boeing Co (BA US), China will take delivery of 8,090 new airplanes between 2019 and 2038 to become the world's largest aviation market in the world. About 74% of them are expected to be single aisle plane and within the total delivery, 67% of them will be for new demand and 33% for replacement (Figure 50). Despite the COVID-19 outbreak, we believe there will not be fundamental change in the long-term aircraft demand in China, though the near-term growth will be slowed by the pandemic. That said, we believe the solid long-term commercial aircraft demand will still present excellent growth opportunity for AECC Power.

Figure 50: Boeing's projection of China's airplane market 2019-2038

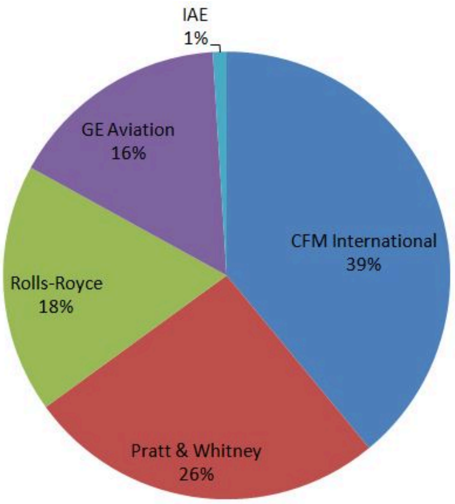


Source: Boeing

AECC Power is also developing engines for China's domestic jet airplane C919 (discussed further below), which represents another key source for it to grow. The other growth area for is the general aviation market as promoted by the government. In 2016, the State Council issued "Guidance opinion for promoting general aviation industry development" which laid out the specific targets of reaching over 5,000 general aviation aircrafts with 500 general aviation airports by the end of 2020. The development of the general aviation market will support the development of the aircraft engine market as well. We believe the general aviation market in China will continue its fast growth given the numerous different applications of general aviation industry including low altitude communication, navigation, surveillance, meteorology and air traffic services. AECC Power's small and mid size engine products fit well into such growing market and will serve as an important source of its revenue growth, in our view.

Localisation supports long-term growth prospects. The need to increase the localisation of aircraft engine supply in China is a major driver for AECC Power's long-term prospects. The recent incident related to the supply of LEAP 1C engines to China by CFM International, as discussed earlier, is a clear demonstration that an "embargo" of foreign engine supply to China is possible and can be fatal to China's plan to develop its own aircraft manufacturing industry. In fact, currently, foreign companies have dominated the global aircraft engine market, with CFM International holding the largest market share at 39%, followed by 26% at Pratt & Whitney, a subsidiary of Raytheon Company (RTN US) in the US (Figure 51). The need for China, with one the most rapidly growing aviation market in the world, to increase its own supply of aircraft engines looks to be absolute logical.

Figure 51: Global aircraft engine market share breakdown



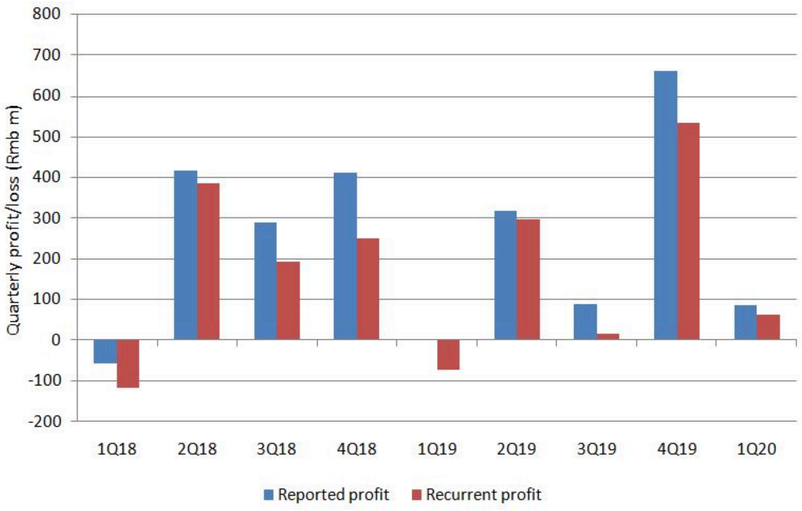
Source: Statista

Along with this direction, AECC Power has been developing the CJ1000AX engine for C919. With a thrust of 98–196 kN, it is comparable to the LEAP 1C engine at 124.5–133.4 kN currently supplying to C919. CJ100AX is now expected to enter into commercial delivery in 2025, which can also be used to power Boeing 737 or Airbus 320 and other similar models. Note that normally an aircraft engine can stay as commercially viable for at least 30 years, so the new product will represent a long-term profit driver for AECC Power. Another development initiative is the AEF3500 turbofan engine, which is intended to power CR929, a long-range 250-to-320-seat wide-body twinjet airliner family to be developed by CRAIC, a joint-venture between COMAC and Russian United Aircraft Corporation (UAC) with commercial launch set for 2025.

2.3 Earnings outlook

AECC Power recorded a recurrent profit of Rmb62.6m in 1Q20, turning around from a loss of Rmb72.2m in 1Q19, with a 3.3% growth in revenue to Rmb3.45bn. The company's 1Q20 profit only achieved 6.9% of the full-year consensus earnings forecast as the COVID-19 outbreak has disrupted the work schedule of its aircraft customers and hence its engine delivery as well. However, similar to AVIC Shenyang, AECC Power has traditionally had volatile quarterly earnings and the outbreak has clearly exacerbated such volatility. Also, historically due to the Chinese New Year, the 1Q is the low season, as reflected in the quarterly profit performance in the last two years (Figure 52).

Figure 52: AECC Power - Quarterly earnings



Source: Company data

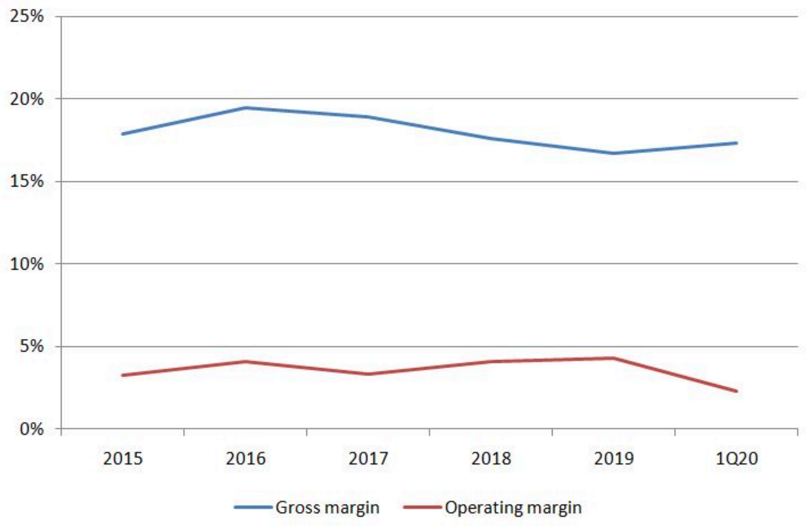
Consensus forecasts are expecting an 18.1% EPS CAGR for the next three years (Figure 53), riding on the demand from both military and civilian aircraft engines. However, we see downside risk for earnings in FY20F and FY21F due to the COVID-19 which affected the near-term aircraft demand and many airlines are postponing their delivery due to the weakened traffic growth. Over the last five years, ACEE Power's gross margin has been stable given its focus on supply of the existing key products; and its operating margin is relatively flat as rise in selling costs was partly offset by lower finance costs (Figure 54). In our view, its margins are likely to maintain stability in the near term, until it sees more significant demand surge from new products like WS-15 in the market.

Figure 53: Consensus earnings forecasts

Year end Dec	2018	2019	2020F	2021F	2022F
Reported profit (Rmb m)	1,063.9	1,077.4	1,285.9	1,509.9	1,776.3
% Change	10.8%	1.3%	19.3%	17.4%	17.6%
EPS (Rmb)	0.47	0.48	0.57	0.67	0.79
EPS Growth %	9.3%	2.1%	18.8%	17.5%	17.9%
PER (x)	51.5	50.5	42.5	36.1	30.7
ROE (%)	4.0%	3.8%	4.2%	4.8%	5.3%

Source: Wind

Figure 54: Gross and operating margin



Source: Company data

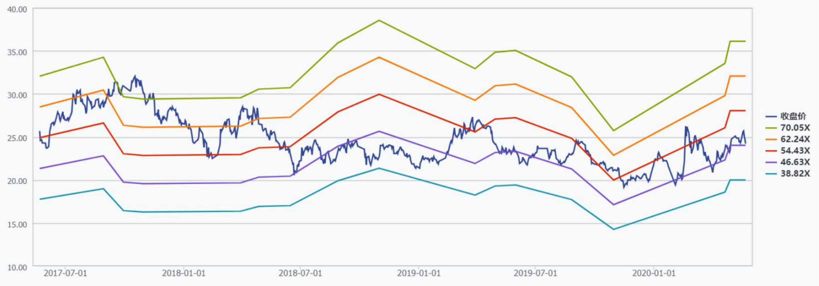
2.4 Key risks

The key risks for AECC Power are: 1.) slower than expected increase in engine orders due to weak demand of military and civilian aircrafts; 2.) shortage of key components due to supply disruptions; 3.) slower than expected progress on new product research and development; 4.) weak demand from export markets; and 5.) diversification into less-profitable businesses.

2.5 Valuation

With its share price dropped by 27% since 2017, AECC is trading at the low end of its PER valuation in the last three years (Figure 55). However, in absolute terms, its 42.5x PER for FY20F does not rank as cheap though this can be justified by its solid leadership position in China's aviation engine market and the fact that it is the sole supplier to the third generation combat aircraft. Relative to its peers, the stock's valuation does not stand out as particularly expensive, though we believe upside will come from the success of its new product development and the recovery of the demand of the civilian aviation market.

Figure 55: AECC Power - P/E Band



Source: Wind

3. AVIC Aircraft (中航飞机, 000768 CH)

We think Avic Aircraft Co Ltd A (000768 CH) (AVIC Aircraft) has a unique position in the bombers and supporting aircraft manufacturing industry in China. It should be a major beneficiary of the potential increase in the orders of supporting aircrafts due to ongoing and upgrade demand. The proposed asset swap with the ultimate parent AVIC will also benefit its margin and profitability. However, with the share price already trading at the high-end of its PER range in the last two years and the details and consideration of the asset injection yet to be announced, we see limited upside from the current level.

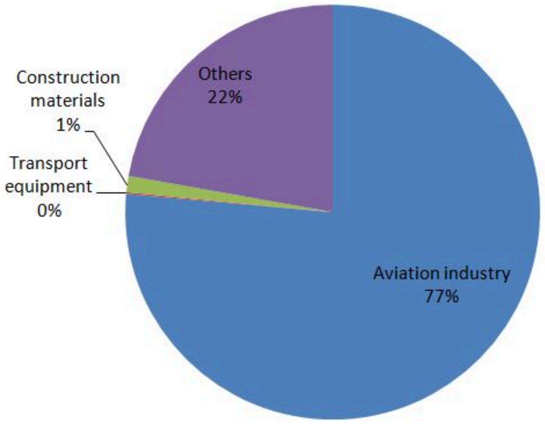
3.1 Background

Listed on the Shenzhen Stock Exchange, AVIC Aircraft engages in the research, development, manufacturing, sales, maintenance and service of various large and medium-sized military (transport, bombers, specials) and civilian aircrafts in China. In addition, the company is a leading supplier of aircraft components including landing gear, braking systems, fuselage etc.

It is also a subcontractor to Boeing and Airbus, supplying various key components to these two leading aircraft manufacturers. In addition, AVIC Aircraft also supplies to the domestically developed commercial aircrafts including ARJ-21 and C919.

As at the end of 2019, AVIC has a controlling 38.18% stake in AVIC Aircraft. Unlike AVIC Shenyang and AECC Power, AVIC Aircraft has a more diversified business portfolio that include non-aviation related business, but still, aviation-related business accounted for 77% of total profit before inter-segment eliminations (Figure 56).

Figure 56: FY19 profit breakdown



Source: Company data

3.2 Investment thesis

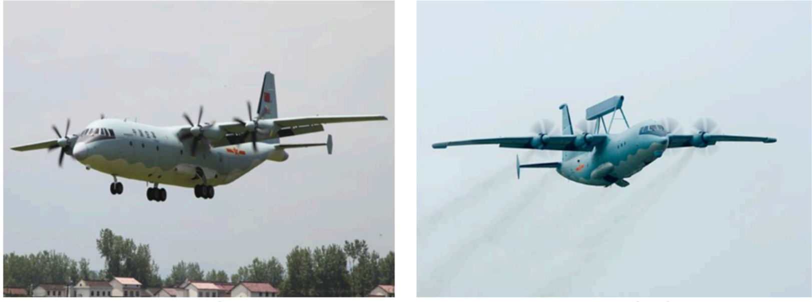
Unique platform for bombers and supporting military aircraft manufacturing. AVIC Aircraft is a specialised platform for the manufacturing of bombers and supporting aircrafts for the PLAAF. It has a longstanding history in the industry, through the assets acquired from sister companies including AVIC Xian Aircraft Industry (Group) Company Ltd (AVIC Xian) and AVIC Shaanxi Aircraft Industry (Group) Company Ltd (AVIC Shaanxi) in 2012. These assets have been involved in the early development and manufacturing of China's military aircrafts dating back to the 1950s.

AVIC Aircraft has may successful and well-received products including transport aircrafts, airborne early warning aircraft, regional airliners which allow it to serve both the military and civilian markets (Figure 57). In the early years of the establishment of the PRC, most of China's military and supporting aircrafts are imported from Russia. Building on the research experience accumulated since then and the growing needs of self-sufficiency in military aircrafts, AVIC Aircraft has a very solid position in the industry. The competitive environment looks favourble to AVIC Aircraft as it is the sole platform for supplying these supporting aircrafts to the PLAAF.

Figure 57: Major aircraft products of AVIC Aircraft

Y-9 Transport aircraft

KJ-200 Early warning aircraft



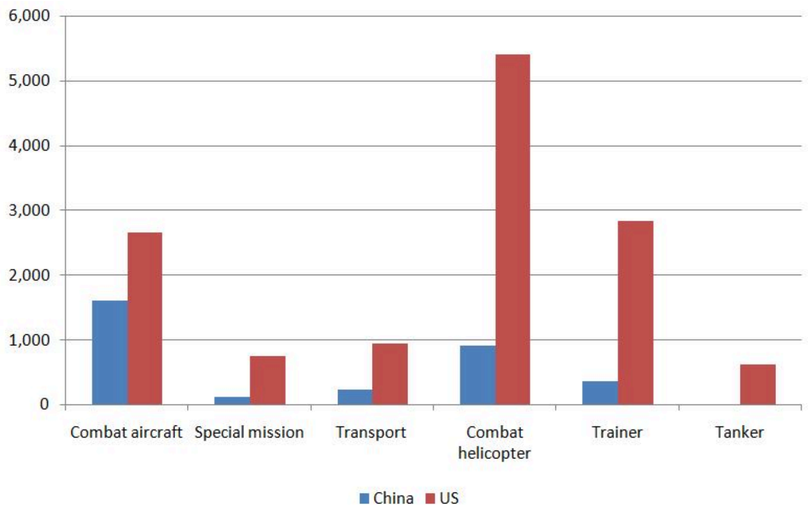
H-6 Bomber

MA60 Regional airliner

Source: Company data

Room for further military supporting aircraft demand growth. A comparison between the breakdown of the US and China military aircraft fleet revealed their significant difference. Combat aircraft only accounted for 20% of the total number of military aircrafts of the US but in China, they accounted for almost 50% of total (Figure 58). This is partly due to China's defensive-oriented military strategy with focus on supporting its land-based military facilities within the mainland. With the change in the global military landscape, China will need to increase its capability in offshore combat. We believe this will drive the country's demand for supporting aircrafts.

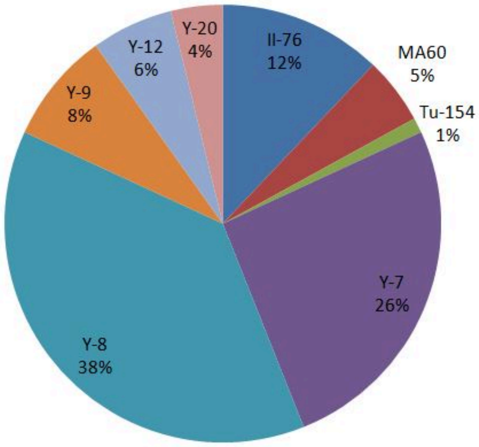
Figure 58: Comparison of US and China military aircraft breakdown



Source: World Air Forces 2020

AVIC Aircraft has a longstanding importance in supplying the transport fleet of PLAAF. Its products Y-series transport aircrafts composed of almost 82% of the total PLAAF transport aircraft fleet (Figure 59). The mainstream product Y-8 (运-8运输机) is equipped with four turboprop engines. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. Y-8, which entered into service in 1981, is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It is capable of hauling 20 tons of cargo or about 82 paratroopers. Its variant Y-9 (运-9运输机) entered into service in 2012, with a capability to carry 25 tons of cargo or about 100 paratroopers. However, with the increasing need for modernisation and upgrade of the PLAAF fleet, we see room for gradual upgrade of the existing Y-7 (运-7运输机) fleet to more advanced models, and this should underpin demand.

Figure 59: Breakdown of the transport aircraft fleet of PLAAF



Source: World Air Forces 2020

AVIC Aircraft's latest transport aircraft Y-20 (运-20运输机) entered into service in 2016. Y-20 has a capacity to hold up to 66tons, with a price tag estimated at US$160m. Currently, the PLAAF has 7 Y-20 in its fleet and we see room for replacement demand, especially in view of the aged long-distance transport aircraft II-76 (伊尔-76运输机) of Soviet Union which entered into service in the 1970s. With a comparable size that of Y-20, II-76 is only capable of holding 48 tons and at a similar load, Y-20 has a range of 7,800km, compared with II-76's 5,000km. The PLAAF currently has 22 II-76 in its fleet.

On the bomber side, AVIC Aircraft's mainstream product is H-6 (轰-6轰炸机), with 120 units of various versions being deployed on the PLAAF. The latest version is H-6N, which is a heavily redesigned version capable of aerial refueling and carrying air-launched cruise missiles. H-6N will give the PLAAF a long-range standoff offensive air capability with precision-guided munitions. We believe this is an important new product to drive AVIC Aircraft's business development in the next few years.

Asset swap to reduce connected transactions. On 16 Nov 1019, AVIC Aircraft announced it plans to enter into an asset swap with AVIC Aircraft Corporation Limited (AACL), a wholly-owned subsidiary of its ultimate parent AVIC. The detailed proposal and the consideration of the transaction have not been finalised and released. Under the preliminary proposal, AVIC Aircraft will swap in the 100% ownership of AVIC Xian, AVIC Shaanxi and AVIC Tianshui Aviation Industry Co., Ltd from AACL. In the meantime, it will swap out several subsidiaries involved in the manufacturing of landing gear, control system and other components.

The swapped in business are mainly involved in the solicitation of orders of manufacturing and production of military and civilian aircrafts. Under the existing arrangement, these companies will delegate AVIC Aircraft to carry out the actual manufacturing work under a "subcontracting" arrangement, which AVIC Aircraft will only receive 99% of the order value for domestic orders. For export orders, AVIC Aircraft will need to pay an agency fee of 0.4-1.4% to these companies. In other words, upon the completion of the asset swap, AVIC Aircraft will be able to realise the additional 1% contract revenue and eliminate the agency fee paid.

In our view, the asset swap will allow AVIC Aircraft to improve its profit margin significantly. Based on its FY19 financial figures, this will add as much as Rm280m to its net profit, or some 49% of the full-year number. In addition, this will remove the significant connected transactions, which will be positive to the minority shareholders.

Capturing both the aircraft components and parts market. Through its components and parts supply business, AVIC Aircraft has the exposure to China's plan to develop its own domestic aircrafts like AR-J21 and C919. The company supplies core parts of AR-J21 including the front fuselage, middle fuselage, wing, front landing gear, etc. As for C919, key parts that AVIC Aircraft supplies including the fuselage and wing. In addition, it also supplies the landing gear and wheel brake system to other models of domestically manufactured aircrafts.

As we discussed earlier, China's plan to develop its own regional and long-ranged jet airliners is an important booster to the country's aircraft components and parts enterprises. The increase in de-globalisation, especially after the COVID-19 outbreak and the rising US-China tension, will mean a growth in opportunity for suppliers to COMAC like AVIC Aircraft.

Besides the domestic market, AVIC Aircraft also has a well-established position in the global components and parts market for customers including Boeing Co (BA US), Airbus Group SE (AIR FP) and Bombardier Inc (BBD/A CN). It has long-term subcontracting relation with these companies (Figure 60), though the pandemic will likely to negatively affect their demand in the near term.

Figure 60: Key components and parts supplied by AVIC Aircraft

Aircraft type	Components/parts
B737	Vertical tail, hatch, rudder etc
B747	Parts for aircraft landing gear and brake system etc
B777	Vertical flat tail tip, composite panel, etc
B787	Vertical tail leading edge, rudder etc
A320	Landing gear, parts for brake system, wings, fuselage panel etc
A340	Landing gear, parts for brake system etc
A350	Spoiler and drop plate etc

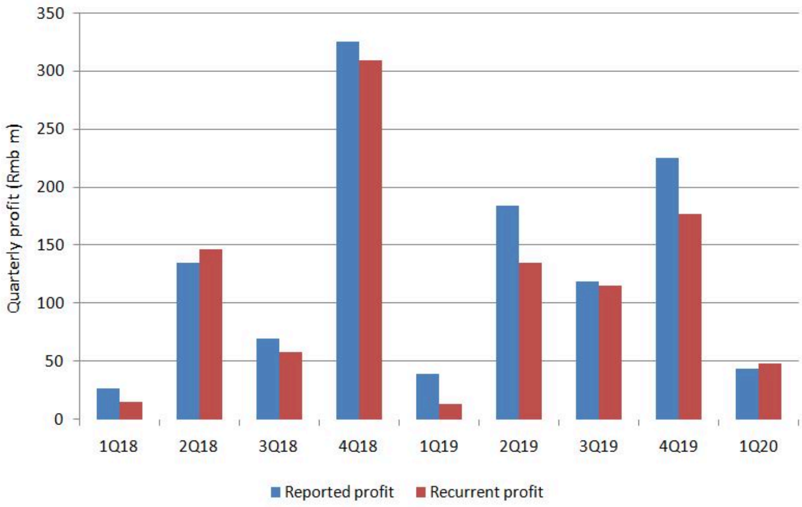
Source: Company data

3.3 Earnings outlook

AVIC Aircraft's reported profit increased by 11.3% in 1Q20 to Rmb43.9m, but this is partly distorted by non-recurrent items including government subsidies and mark-to-market loss of its investment in Guotai Junan

Securities (A) (601211 CH). Excluding these, recurrent earnings rose 256% YoY. The 1Q20 profit only represents 6% of full-year consensus earnings forecasts, again, this is due to the traditional seasonality of the business. 1Q is normally the low season which accounted for just 5.8% of annual profit in the last two years (Figure 61).

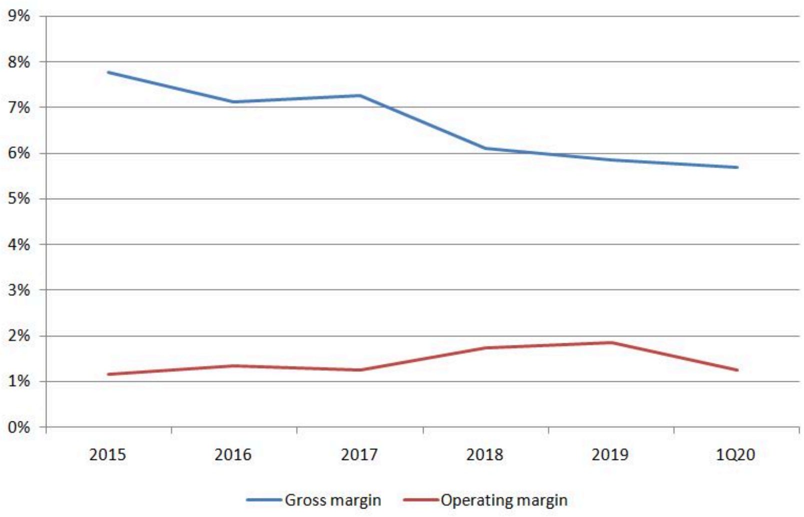
Figure 61: AVIC Aircraft - Quarterly earnings



Source: Company data

Gross margin has been trending down in the last five years, primarily driven by the growth in its aircraft manufacturing business which has a lower margin than other non-core businesses. Despite so, the operating margin has been steadily increasing. 1Q20 operating margin of 1.3% is not a good indication for full-year result, and in fact, 1Q20 margin has expanded by 1.2pp YoY (Figure 62). The expansion in operating margin over time is a result of continuous decline in management costs. We believe the completion of the asset swap may give a boost to gross margin given the removal of the "cut" in the revenue by AVIC Xian and AVIC Shaanxi and the agency fees paid for them on export orders.

Figure 62: Gross and operating margin



Source: Company data

According to consensus, AVIC Aircraft's EPS is expected to grow by a CAGR of 11.4% for the next three years (Figure 63). Such growth rate is below the average for the sector over the same period, reflecting its weaker profitability of key products than its peers. In addition, its ROE of 4.2% for FY20F is also the lowest when compared with peers. However, the upside will come from the asset swap, which we believe yet to be reflected in the consensus forecasts as details are not yet announced.

Figure 63: Consensus earnings forecasts

Year end Dec	2018	2019	2020F	2021F	2022F
Reported profit (Rmb m)	558.0	568.9	735.9	873.5	794.2
% Change	18.4%	1.9%	29.4%	18.7%	-9.1%
EPS (Rmb)	0.20	0.21	0.27	0.32	0.29
EPS Growth %	17.6%	5.0%	28.6%	18.5%	-9.4%
PER (x)	85.4	81.3	63.3	53.4	58.9
ROE (%)	3.5%	3.4%	4.2%	4.7%	4.4%

Source: Wind

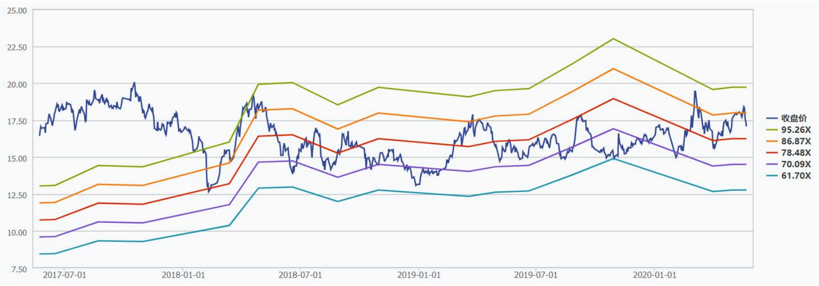
3.4 Key risks

The key risks for AVIC Aircraft are: 1.) slower than expected increase in aircraft orders due to weak demand; 2.) shortage of key components due to supply disruptions; 3.) weak performance of the non-core business; and 4.) higher than expected consideration for the proposed asset swap.

3.5 Valuation

Building on the expectation of an improved profit profile after the proposed asset swap with AVIC, AVIC Aircraft has seen its share price rallied by 30% since 2019, and sitting on a PER of 63.3x for FY20F (Figure 64). This is at the high end of the range since 2018, reflecting a lot of good news. Fundamentally, its profit profile will improve as it will increase its focus on the aircraft manufacturing business than the swapped-out components and parts businesses. We like its improved business profile, but think that upside of the share price looks less than our two preferred picks, namely AVIC Shenyang and AECC Power. The stock also does not stand out as very attractive in valuation relative to its peers on both PER and P/B basis, taking into consideration its earnings growth and ROE, in our view.

Figure 64: AVIC Aircraft - P/E Band



Source: Wind

4. China Spacesat (中国卫星, 600118 CH)

The strength of China Spacesat Co Ltd A (600118 CH) (China Spacesat) is its excellent market position in China's satellite industry, as demonstrated by its highly experienced product development capability, competitive technological knowhow and patronage by well-known customers. It is in a solid position to benefit from the government's support of satellite internet development under the country's new infrastructure plan. However, we are skeptical towards the stock's valuation - at 95.5x PER for FY20F with an 18% 3-year EPS CAGR, the valuation has factored in most, if not all, of the good news and positive future prospects. Any disappointment will result in significant downside on the stock, in our view.

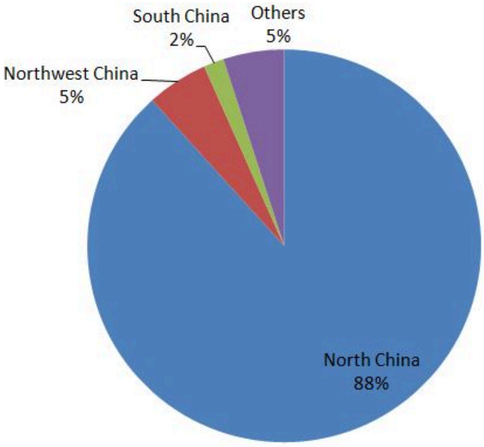
4.1 Background

China Spacesat specialises in the research, development and manufacturing of small and micro satellites, manufacturing of integrated satellite ground application systems and terminal equipment and provision of satellite operation services.

In the field of aerospace manufacturing, the company has developed CAST10, CAST20, CAST2000, CAST3000, CAST4000 and many other small/ micro satellite public platforms. Its satellite products cover the areas of optical remote sensing, electromagnetic and microwave remote sensing, science and technology test etc. It has established public usage platform covering small/micro satellites with size of 1kg-1000kg. In aerospace technology applications, it provides customers with products and services in the areas of satellite communications, satellite navigation, satellite remote sensing, cloud computing and information security, and smart cities.

At the end of 2019, China Academy of Space Technology (CAST) is China Spacesat's largest shareholder with a 51.46% stake, and CAST is under the ownership of CASC. China Spacesat is a very focused company which derived all its profit from aerospace manufacturing and satellite application. By geography, North China accounted for 88% of its profit (Figure 65).

Figure 65: FY19 profit breakdown by geography

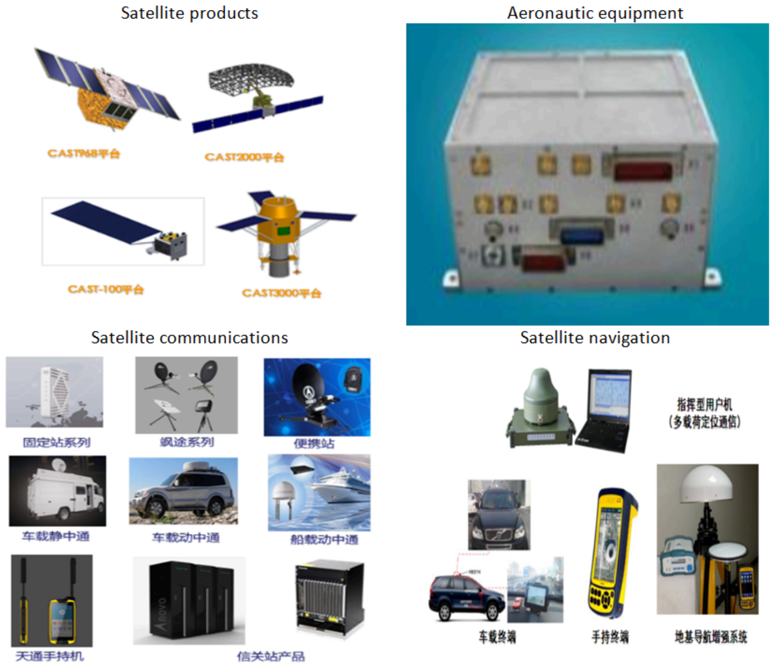


Source: Company data

4.2 Investment thesis

Significant position in China's satellite industry. China Spacesat has a leading position in China's satellite industry with its key products and services cover small/micro satellite, aeronautic equipment, satellite communications and satellite navigation among others (Figure 66). It has advanced technological research and production bases in Beijing, Shenzhen, Xian and Yantai. Its proven product capability and technological strength have secured a long list of quality customers, including governmental ministries like Ministry of Ecology and Environment, Ministry of Water Resources and China Meteorological Administration etc, as well as the private sector including Huawei, ZTE Corporation etc. Its portfolio of prominent international customers include Singtel, Swedish Space Corporation, Thales Alenia Space etc.

Figure 66: Major satellite and related products of China Spacesat

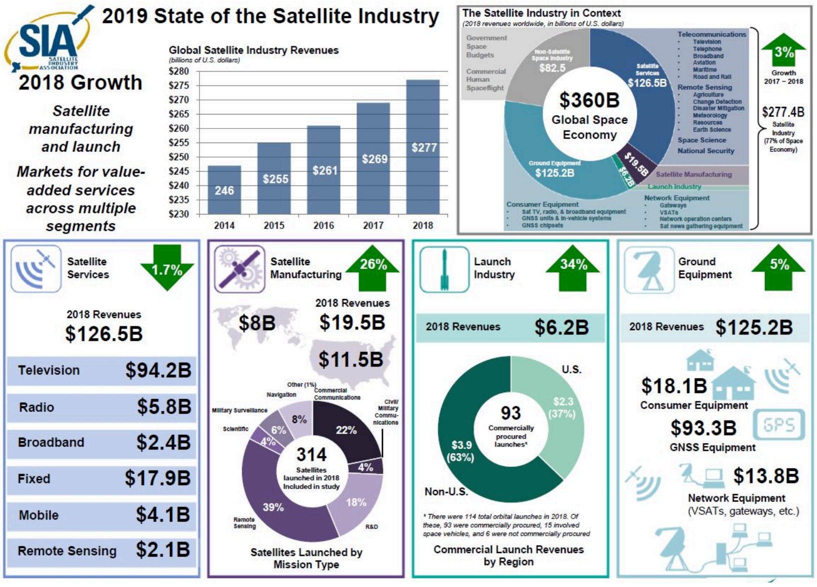

Satellite products
CAST968平台
CAST2000平台
CAST-100平台
CAST3000平台
Aeronautic equipment
Satellite communications
固定站系列
飒途系列
便携站
车载静中通
车载动中通
船载动中通
天通手持机
信关站产品
Satellite navigation
指挥型用户机
(多载荷定位通信)
车载终端
手持终端
地基导航增强系统

Source: Company data

Since China Spacesat's establishment, it has successfully launched over 110 satellites, with over 90 of them currently in operations, accounting for about one-third of China's satellites currently in orbits. In 2019, China Spacesat successfully launched 11 satellites. Included in last year's list are Bufeng 1A and Bufeng 1B (捕风一号) which are China's first time launch from an ocean-going mobile launch platform by the "Long March 11" rocket. The Bufeng satellites are used for wind speed measurements over oceans which are expected to improve typhoon monitoring and weather forecasts in China. As for satellite application, it has exported the Beidou navigation system (北斗导航) equipment to Southeast Asian countries, along with the completion of various satellite communication projects. In our view, China Spacesat's strong technological capability and competitive strength should see it ride on the growth in application of satellite technology.

Excellent growth potential from satellite demand. Globally, the satellite industry market size amounted to US$277bn in 2018, and this represents a CAGR of 3% from 2014. By sub-sector within the industry, satellite service accounted for 46%, followed by ground equipment at 45%, satellite manufacturing at 7% and launch industry at 2% (Figure 67). In particular, with a YoY growth rate of 26%, satellite manufacturing has outgrown that for satellite service and ground equipment. Due to the maturity of the satellite industry in the US, the global revenue has been dominated by the country, leading to a slower overall growth. For example, the US alone accounted for 60% of the global satellite manufacturing revenue, but the growth was just 1.1% CAGR in the last five years, compared with 10.8% outside of the US.

Figure 67: Snapshot of global satellite industry

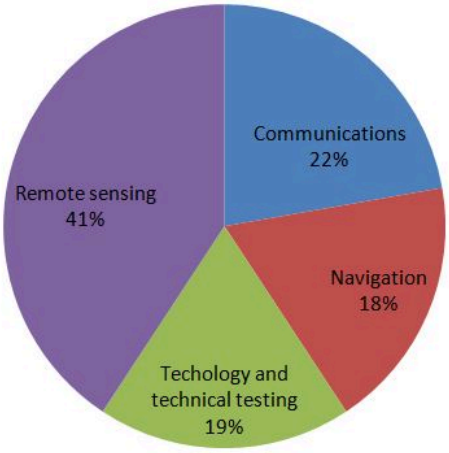


Source: State of Satellite Industry 2019

Instead, looking at China, the satellite industry is still in a rapidly-growing stage. It is estimated that the market size will reach Rmb80bn in 2020, a 33% increase from Rmb60bn in 2018. In 2019, the total number of satellite launched in China is 54, down from 91 in 2018. However, 12 of them are communications satellites, a rapid increase from just 4 in 2018, indicating their strong growth prospects (Figure 68). By 2025, it is estimated that the total value of satellite communications equipment market may reach a size of Rmb50bn.

Government support plays an important role in the satellite industry development. China currently has four aerospace and satellite launch centers, including Jiuquan, Xichang, Taiyuan and Wenchang, providing support to the satellite industry. Also, the plan by the government to introduce the National Aerospace Law, hopefully between 2022-2025, will lay the legal framework for the commercial aerospace business development and this should be positive towards further stimulating the industry growth.

Figure 68: Breakdown of satellite launched in 2019 by use



Source: www.chyxx.com

Well fit into China's satellite internet new infrastructure development. On 20 Apr 2020, the NDRC officially provided a clear explanation of the concept of new infrastructure - information infrastructure, converged infrastructure and innovative infrastructure. Satellite internet is officially included as one constituent in information infrastructure, and becomes part of China's new infrastructure initiative (Figure 69).

Figure 69: China's new infrastructure initiative

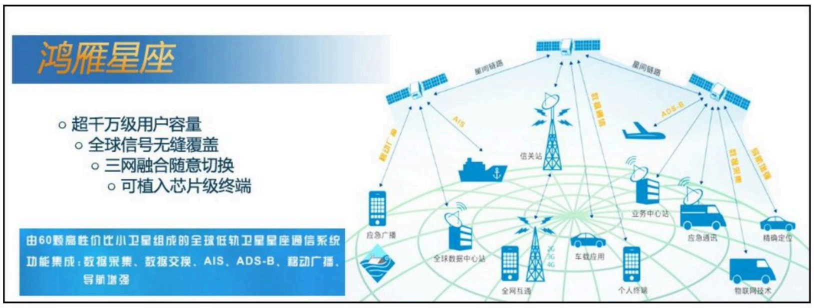
Category	Scope
Information infrastructure	5G, internet of things, industrial internet, satellite internet as communication network infrastructure; artificial intelligence, cloud computing, blockchain as new technology infrastructure; data centers and intelligent computing centers as computing infrastructure
Converged infrastructure	In depth application of Internet, big data, artificial intelligence and other technologies to support the transformation and upgrading of traditional infrastructure, thus forming converged infrastructure, such as smart transportation infrastructure, smart energy infrastructure, etc
Innovative infrastructure	Infrastructure supporting scientific research, technological development and product development with public welfare nature, such as major scientific and technological infrastructure, scientific and educational infrastructure, industrial technological innovation infrastructure, etc

Source: NDRC

With satellite internet formally regarded as a part of China's new infrastructure initiative, we believe there will be more supportive policies towards the development of the satellite industry and China Spacesat is set to benefit. Satellite internet can be used for complementary coverage of areas that is unable to reach by land base backbone and network at relatively low cost. China's initiative in satellite internet was first introduced in 2015 when CASC and AVIC spearhead the development of the low earth orbit (LEO) communication projects "Hongyan constellation" (鸿雁星座) and "Hongyun project" (虹云项目).

Both Hongyan and Hongyun have their first satellite successfully launched and put into orbit in 2018. It is expected that the first phase of the Hongyan constellation with 60 satellites will commence operations in 2022, and the ultimate plan is for it to have 300 satellites in operations (Figure 70). The Hongyun project involves the building of a satellite borne broadband mobile internet with global network coverage. Upon full commission expected to be by 2025, Hongyun will have a total of 156 LEO satellites in operations. By end of this year, the Hongyan project will be ready for initial demonstration purpose.

Figure 70: "Hongyan constellation"



鸿雁星座

- 超千万级用户容量
  - 全球信号无缝覆盖
    - 三网融合随意切换
      - 可植入芯片级终端

由60颗高性价比小卫星组成的全球低轨卫星星座通信系统
功能集成：数据采集、数据交换、AIS、ADS-B、移动广播、
导航增强

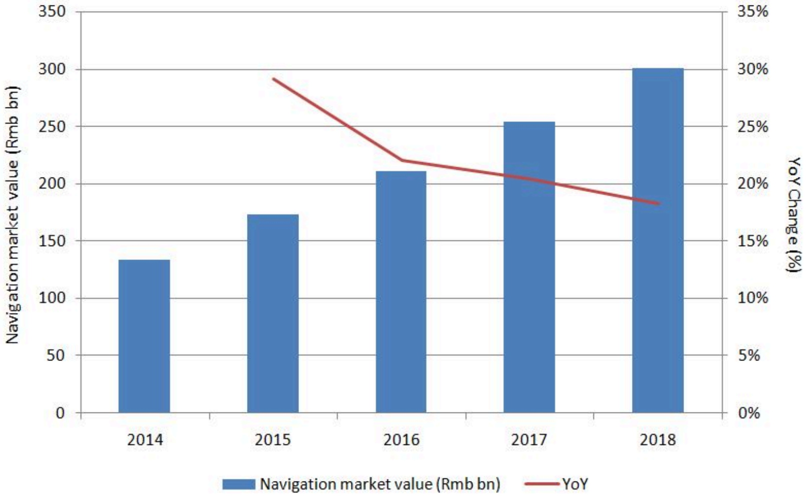
Source: www.baidu.com

As we can see, the development of satellite internet will mainly use small satellites, and this represents a huge market for China Spacesat which has always focused on micro/small satellites. Internet projects by SpaceX, Facebook Inc A (FB US), Boeing Co (BA US) and other companies all use small satellites as carriers and choose LEO that is normally with an altitude of 2,000 km or less. Compared with large satellites, small satellites' advantages are low cost, short R & D period, low risk, fast launch and low delay. This is a sizeable market and the global micro/small satellite market is estimated to reach US$6.4bn by 2021.

Increase in comprehensive satellite application. Another key growth area is satellite application. China Spacesat provides customers with satellite-related products as well as integrated solution covering areas including satellite communications, satellite navigation, remote sensing, UVA system integration and services and smart city. These are areas that will see significant increase in the usage of satellite when coverage and technology improve. As a result, such demand will have a few years of time lag after the growth in satellite manufacturing profit takes off. However, their business nature means that recurrent income will be strong.

Growth rate of China's satellite navigation and positioning system market has been phenomenal at an average of 22.5% between 2014 and 2018 (Figure 71). China Spacesat has been providing navigation and positioning hardware and equipment for both military and civilian use of China's propriety "Beidou" positioning technology. In the area of UAV, through low altitude remote sensing multi-source data acquisition, transmission and processing, it provides customers in marine monitoring, power, forestry, oil & gas, environmental protection industries with real-time monitoring data, 4D data products, remote sensing data thematic analysis products. Also, China Spacesat is the only unit in China that has obtained airworthiness qualification in all five PLA theater commands.

Figure 71: China's satellite navigation and positioning system market size

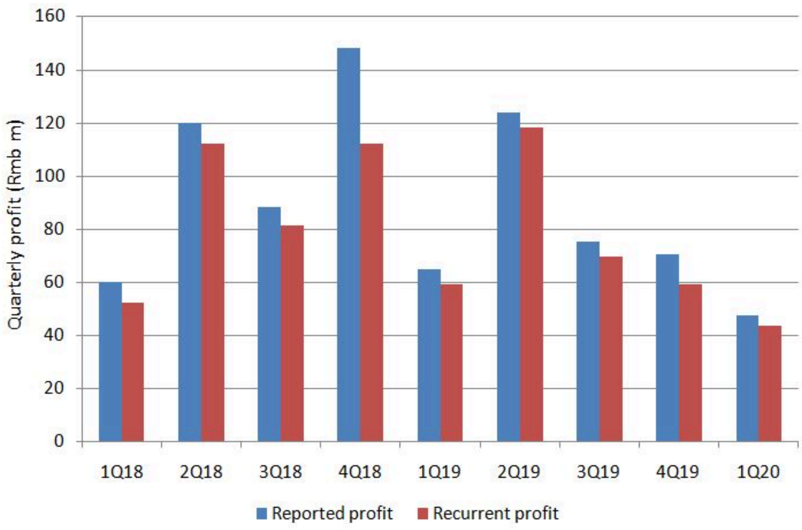


Source: bg.qianzhan.com

4.3 Earnings outlook

China Spacesat recorded a 26.2% decline in its recurrent profit to Rmb43.7m in 1Q20 on the back of a 16.6% drop in revenue (Figure 72). Softened demand has led to the delay in some types of satellite of the company and this has reflected negatively on both revenue and profit. Its 1Q20 profit amounted to 11.8% of the full-year consensus earnings forecasts for FY20. Given that its profit has historically been low in 1Q, we see room for the momentum to accelerate into 2Q20. The outbreak of COVID-19 has also negatively affected its business in 1Q20, and we believe the impact will fade over the rest of the year.

Figure 72: China Spacesat - Quarterly earnings

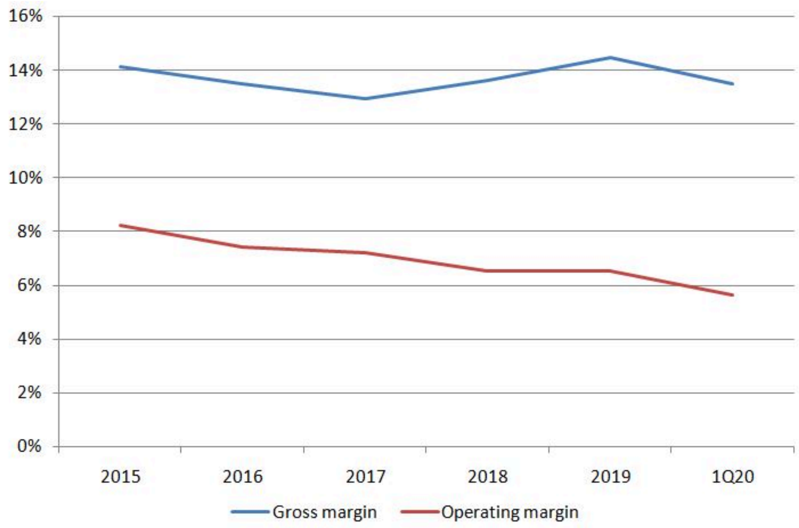


Source: Company data

Gross margin has started to improve in FY18 due to the move to higher margin products, and has expanded by 1.5pp in these two years (Figure 73). At the operating level, however, margin has been trending down continuously since FY15, largely as a result of the continued rise in selling and management expenses. These two costs together, has increased by 44% since FY15 and as a proportion of revenue, rise from 6.7% in FY15 to 8.1% in FY19. As revenue increased by just 18.6% over the period, it looks like that China Spacesat's cost management has been weak. We are concern about this trend will continue and see risk on further downtrend on its operating margin.

Consensus forecasts now expect a 18% EPS CAGR over FY19A-FY22F (Figure 74), slightly above the industry average, but risk is more on the downside given the cost pressure in the near term. The slowdown in earnings momentum as imputed by the consensus forecasts is also a risk for China Spacesat.

Figure 73: Gross and operating margin



Source: Company data

Figure 74: Consensus earnings forecasts

Year end Dec	2018	2019	2020F	2021F	2022F
Reported profit (Rmb m)	417.6	335.6	403.1	469.4	541.6
% Change	2.0%	-19.6%	20.1%	16.4%	15.4%
EPS (Rmb)	0.35	0.28	0.34	0.40	0.46
EPS Growth %	1.9%	-20.0%	21.4%	17.6%	15.0%
PER (x)	92.8	116.0	95.5	81.2	70.6
ROE (%)	7.6%	5.9%	6.7%	7.2%	7.3%

Source: Wind

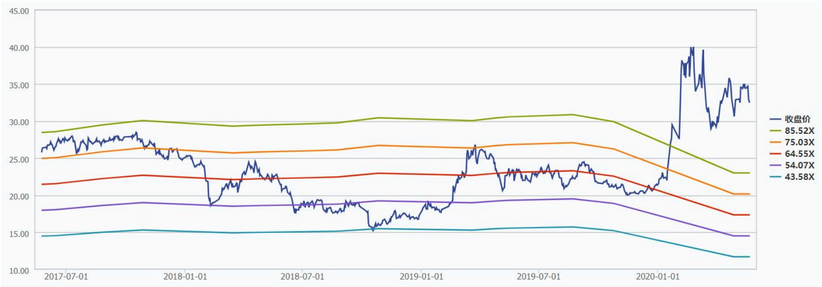
4.4 Key risks

The key risks for China Spacesat are: 1.) slower than expected increase in demand; 2.) shortage of key components due to supply disruptions; 3.) inability to control the rising selling and management costs; 4.) technical issues that affect the performance of its satellites; and 5.) expansion into less profitable non-core businesses.

4.5 Valuation

Riding on the encouraging growth outlook of satellite internet, share price of China Spacesat has rallied by 88.4% since 2019 and 52% YTD, outperformed all stocks in the sector and both the Shanghai and Shenzhen Composite Indices by wide margins. We believe the euphoria building on the positive impact of the potential of satellite internet has been well factored in the current share price. Although this development will be very supportive to China Spacesat's earnings outlook, we believe that valuation has already gone through the roof at 95.5x FY20F PER, and any disappointment will be disastrous to the share price (Figure 75). At the current level, we feel that risk outweighs return and will shy away from this name though its fundamentals look appealing over the long term.

Figure 75: China Spacesat - P/E Band



Source: Wind

5. China Avionics Systems (中航电子, 600372 CH)

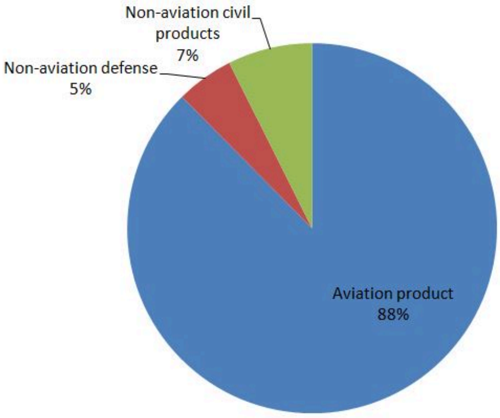
In our view, China Avionics Systems Co (600372 CH) (AVIC Avionics) has a solid market position in the avionics market and should capture the growth in the military and civilian aviation market. It is also one of the most successful companies in promoting the use of defense technology in civilian market through its wide spectrum of products. However, despite trading on low-end of its PER range, we do not see an imminent re-rating due to competitive landscape, more complicated shareholding structure and connected transactions.

5.1 Background

AVIC Avionics is primarily engaged in the business of providing customers, both military and civilian aircraft manufacturers, with integrated avionics solutions. Avionics are the electronic systems used on aircraft, artificial satellites, and spacecraft. It also expands into avionics-related services in the fields of aerospace, weapons, ships and other large defense and security business areas, as well as industrial manufacturing business areas.

As at the end of 2019, Avichina Industry & Tech H (2357 HK) (Avichina) has a direct 43.21% stake in AVIC Avionics. China Avionics Systems Co., Ltd (AVIC Systems) is the second largest shareholder with a 17.99% stake, AVIC has a 8.09% stake and Hanzhong Aviation Industry (Group) Co., Ltd (Hanzhong Aviation) holds a 3.39% stake. Avichina, AVIC Systems and Hanzhong Aviation are all ultimately controlled by AVIC. Aviation product segment is the most important profit contributor, accounting for 88% of its FY19 profit (Figure 76).

Figure 76: FY19 profit breakdown

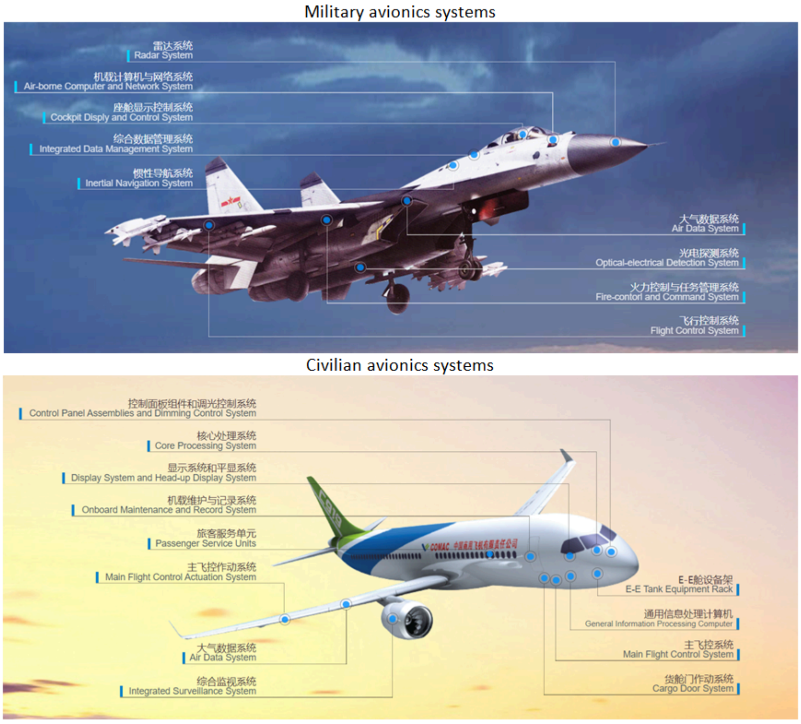


Source: Company data

5.2 Investment thesis

Leading player in the avionics market in China. AVIC Avionics serves both the military and civilian markets by providing advanced avionics systems to aircrafts. The company has established various subsidiaries in Beijing, Jiangsu, Shanghai, Shanxi, Shaanxi, Gansu and Sichuan with strong research and production capability in avionics instruments, systems and technology. Under the support of AVIC, it has some of the best avionics products in the country (Figure 77). Many of these subsidiaries, acquired through batches of injections from AVIC since 2009, have been in the business of avionics design and manufacturing for more than 20 years with established market positions.

Figure 77: Major avionics products of AVIC Avionics


Military avionics systems
雷达系统
Radar System
机载计算机与网络系统
Air-borne Computer and Network System
座舱显示控制系统
Cockpit Disply and Control System
综合数据管理系统
Integrated Data Management System
惯性导航系统
Inertial Navigation System
大气数据系统
Air Data System
光电探测系统
Optical-electrical Detection System
火力控制与任务管理系统
Fire-contorl and Command System
飞行控制系统
Flight Control System
Civilian avionics systems
控制面板组件和调光控制系统
Control Panel Assemblies and Dimming Control System
核心处理系统
Core Processing System
显示系统和平显系统
Display System and Head-up Display System
机载维护与记录系统
Onboard Maintenance and Record System
旅客服务单元
Passenger Service Units
主飞控作动系统
Main Flight Control Actuation System
大气数据系统
Air Data System
综合监视系统
Integrated Surveillance System
E-E舱设备架
E-E Tank Equipment Rack
通用信息处理计算机
General Information Processing Computer
主飞控系统
Main Flight Control System
货舱门作动系统
Cargo Door System

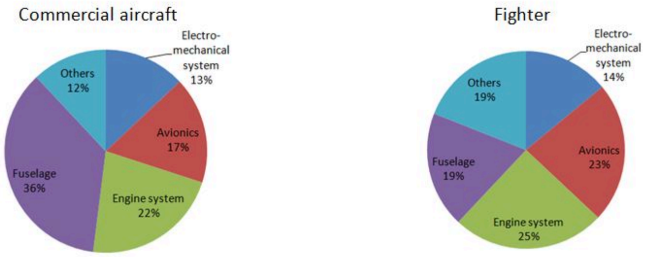
Source: Company data

Supported by many research institutes under entrusted management arrangement, including the Radar & Electronics Research Institute, Luoyang Institute of Electro-optical Devices, Aeronautical Radio Electronics Research Institute, Xian Flight Automatic Control Research Institute and Aeronautics Computing Technique Research Institute, AVIC Avionics has very solid technological capability. This has allowed it to enjoy a monopoly in the supply of many avionics systems to China's aviation industry. Unlike the military aircraft and engine manufacturing companies, there are other avionics companies competing with AVIC Avionics across some other different avionics products and its research capability is an important advantage.

Aircraft demand growth to benefit its avionics business. Avionics is a demand derived from aircraft demand, and the growth in China's military and civilian aircraft fleet, as we discussed earlier, should benefit AVIC Avionics. Avionics is a significant part of the cost of an aircraft - roughly 17% for commercial aircraft and 23% for fighter (Figure 78). As such, it represents a sizeable investment in an aircraft's value, and presents AVIC Avionics good profit opportunity.

AVIC Avionics has been the sole supplier of the main and automatic flight control systems, cockpit display and control systems and atmospheric data systems for China's military and civilian aircrafts. In addition, it is one of the main suppliers of the photoelectric detection systems, computer and network systems and inertial navigation systems to the aircrafts. Given this comprehensive product range and track record, we believe AVIC Avionics is in a good position to gain from the growth in China's aircraft fleet.

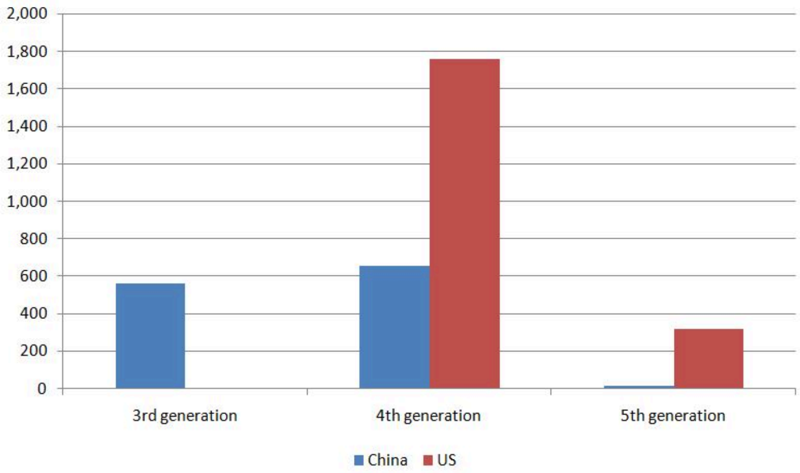
Figure 78: Cost breakdown of commercial aircraft and fighter



Source: www.chyxx.com

Further needs to upgrade China's military aircraft fleet is an important driver for the products of AVIC Avionics. With most of China's fighters are still in the third and fourth generations, compared with fourth and fifth generations for the US (Figure 79), the upgrade demand is imminent and very significant, in our view. In addition, new generation combat aircraft requires more sophisticated avionics system to enhance their combat capability. As such, the proportion of investment in avionics is likely to be higher. With regard to commercial aircrafts, AVIC Avionics has been supplying the control board assembly and dimming control systems for C919 and MA700, signifying its ability to capture the growth in China's domestically-made aircraft.

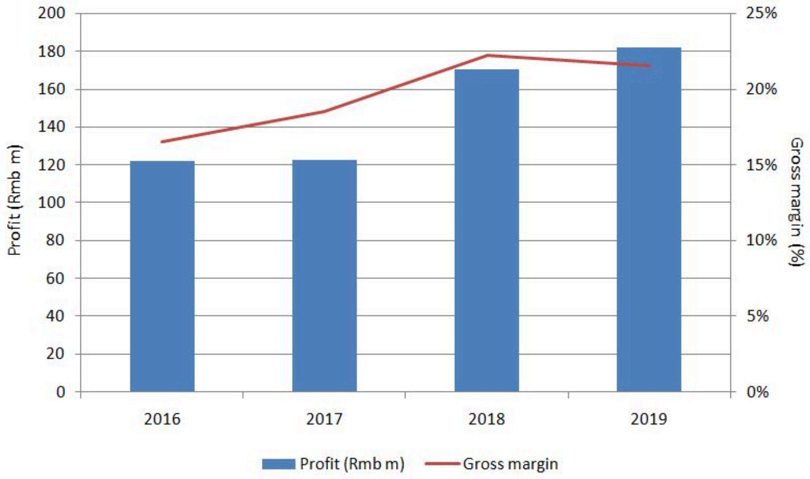
Figure 79: Breakdown of US and China fighter fleet by generation



Source: World Air Forces 2020, Wikipedia

Non-aviation products will provide long-term upside to earnings. Among the aerospace and defense sector companies, AVIC Avionics can be considered as the best in capturing the trend of increase in civilian use of defense technology. In FY19, its non-aviation civilian products accounted for 7% of its profit. In addition, the business has witnessed steady expansion in gross margin, from 16.5% in FY16 to 21.6% in FY19 (Figure 80).

Figure 80: Growth in non-aviation civilian product profit



Source: Company data

Over the last three years, profit from civilian products has increased by 49.3%, demonstrating its success in commercialising its defense technology. Its civilian products include four main areas: 1.) electronic information; 2.) electromechanical automation; 3.) basic device; and 4.) smart city (Figure 81). Many of these products can contribute to China's development of the new infrastructure. Given the company's success in executing this growth strategy, we believe non-aviation products will provide long-term upside to its earnings.

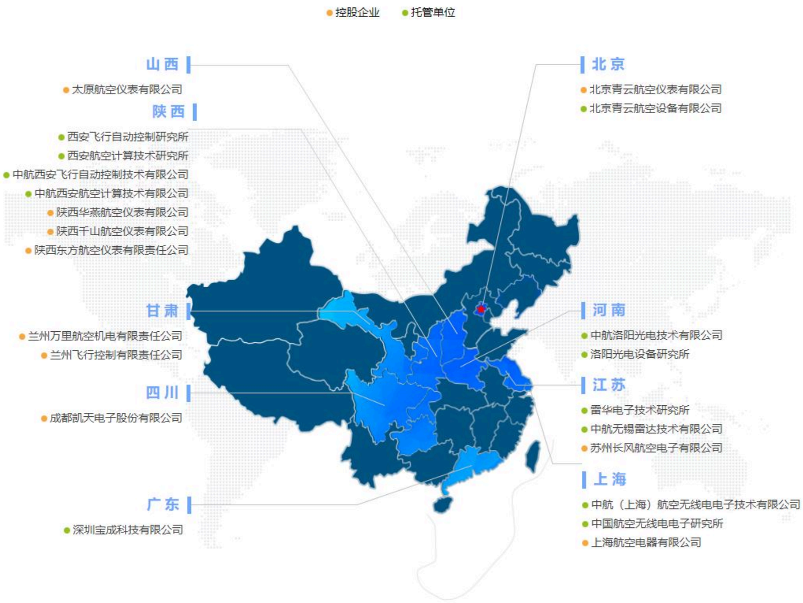
Figure 81: Key non-aviation civilian products of AVIC Avionics

Product category	Detailed products
Electronic information	Automotive electronics, power supply, general aviation air traffic control and marine electronics projects, integrated data collection, transmission, processing, display, security data stream product and system solution.
Electromechanical automation	Motors and drive systems, high-power drive motors, precision motors, special motors, actuation supporting systems and control systems.
Basic device	Connectors, microelectronics, sensors, gyros and other related products.
Smart city	Smart transportation, biometrics and smart home.

Source: Company data

Potential asset injections may improve profitability. AVIC Avionics is currently entrusted to manage some avionics subsidiaries of AVIC and also five research institutes (Figure 82). In return for the entrusted arrangement, AVIC Avionics receives an annual management fee equals to 2% of the audited revenue of the entrusted enterprises. In 2019, such management fee amounted to Rmb40.2m, representing 7% of its profit.

Figure 82: Subsidiaries and entrusted management entities of AVIC Avionics


● 控股企业
● 托管单位
山西
● 太原航空仪表有限公司
陕西
● 西安飞行自动控制研究所
● 西安航空计算技术研究所
● 中航西安飞行自动控制技术有限公司
● 中航西安航空计算技术有限公司
● 陕西华燕航空仪表有限公司
● 陕西千山航空仪表有限公司
● 陕西东方航空仪表有限责任公司
甘肃
● 兰州万里航空机电有限责任公司
● 兰州飞行控制有限责任公司
四川
● 成都凯天电子股份有限公司
广东
● 深圳宝成科技有限公司
北京
● 北京青云航空仪表有限公司
● 北京青云航空设备有限公司
河南
● 中航洛阳光电技术有限公司
● 洛阳光电设备研究所
江苏
● 雷华电子技术研究所
● 中航无锡雷达技术有限公司
● 苏州长风航空电子有限公司
上海
● 中航（上海）航空无线电电子技术有限公司
● 中国航空无线电电子研究所
● 上海航空电器有限公司

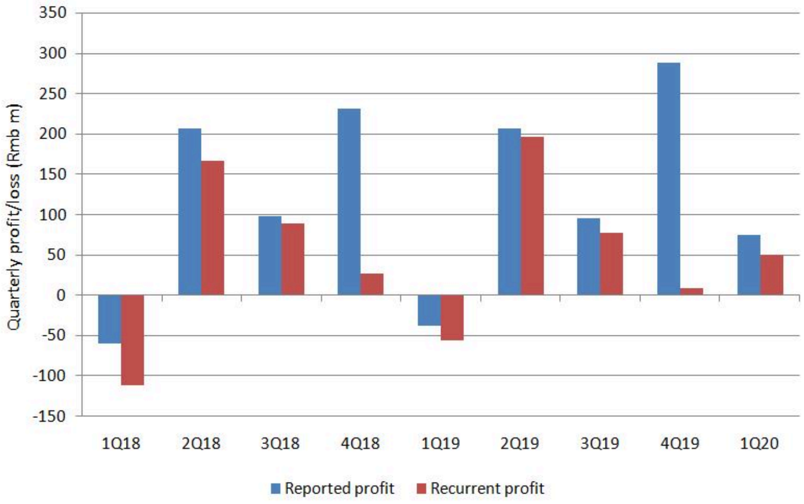
Note: Orange - subsidiaries, Green - entrusted entities. Source: Company data

Although the profit contribution from management fee is not very material, many of these assets are highly relevant to its current operations. On the back of the central government's encouragement of whole group listing, we believe there is potential for AVIC Avionics to cherry pick some good assets for acquisition. Based on the 2019 management fee, we calculate that total revenue of these entrusted enterprises may amounted Rmb2bn (not 100% share) and this equals to 25% of AVIC Avionics' total revenue. In addition, while the research institutes may not be generating revenue, they are at the forefront of avionics technology and will provide the company long-term capability for new product development.

5.3 Earnings outlook

AVIC Avionics turned around its bottom line in 1Q20, with a recurrent profit of Rmb51.2m (reported profit Rmb74.9m) in the quarter, compared with a recurrent loss of Rmb55.7m (reported loss of Rmb37.5m) a year ago. This is partly attributable to the disposal of the loss-making AVIC Shaanxi Baocheng Aviation Instrument Co., Ltd (Baocheng) in late-2019. It is also positive to see 1Q20 is the only first quarter that it made a profit since 2018 (Figure 83). Its 1Q20 profit now amounted to 12% of the full-year consensus earnings forecasts. Normally, the peak profitability quarter for AVIC Avionics is 2Q, so we expect a more significant profit pick-up in the next quarter, especially as some product deliveries in 1Q20 have been hold back due to the COVID-19 outbreak.

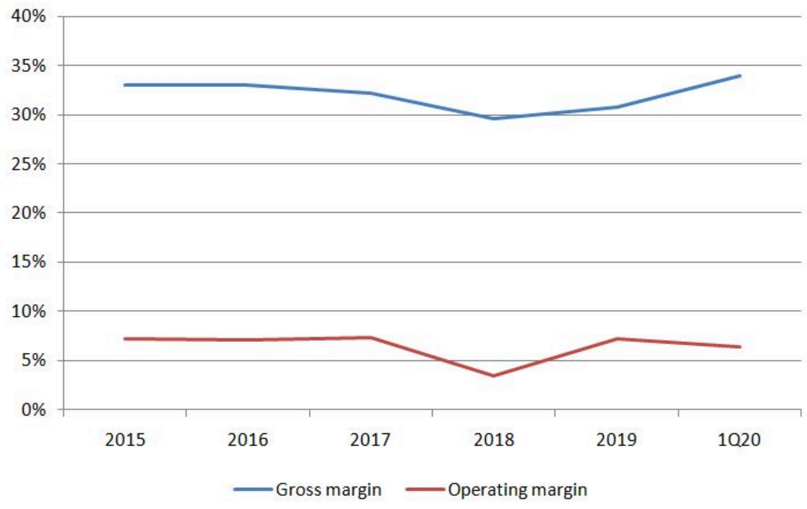
Figure 83: AVIC Avionics - Quarterly earnings



Source: Company data

Gross margin has edged up in FY19 due to improvement in the performance of the aviation product segment with an 1.32pp expansion in its segment gross margin, despite margin contraction for the other two businesses (Figure 84). Further improvement in margin in 1Q20 reflects the positive impact of the disposal of Baocheng and we expect the trend to continue into the rest of the year. However, operating margin for the last five years has very much maintained a tight range, as higher selling, administrative and finance costs offset the benefit from higher investment income. Market consensus now expects a 15.3% EPS CAGR over the next three years, slightly below the sector average of 17.5%, however, its ROE of 7.4% for FY20F is ranked the second highest (Figure 85). Beyond FY20, we believe its earnings will highly depend on the demand from the growth of both the military and civilian aircrafts in China.

Figure 84: Gross and operating margin



Source: Company data

Figure 85: Consensus earnings forecasts

Year end Dec	2018	2019	2020F	2021F	2022F
Reported profit (Rmb m)	479.3	556.0	637.4	739.0	857.4
% Change	-11.6%	16.0%	14.6%	15.9%	16.0%
EPS (Rmb)	0.27	0.32	0.36	0.42	0.49
EPS Growth %	-12.9%	18.5%	12.5%	16.7%	16.7%
PER (x)	49.2	41.5	36.9	31.6	27.1
ROE (%)	6.3%	7.1%	7.4%	7.9%	8.7%

Source: Wind

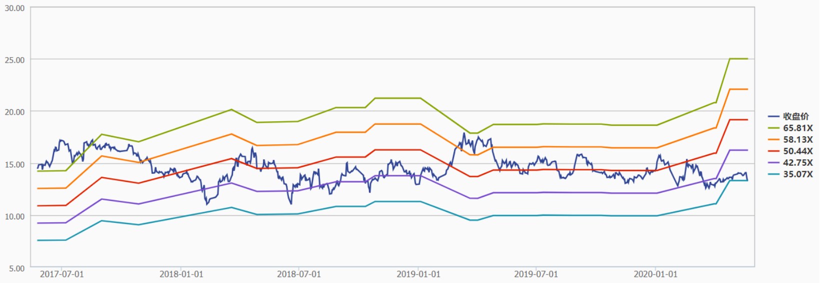
5.4 Key risks

The key risks for AVIC Avionics are: 1.) slower than expected increase in orders due to weak aircraft demand; 2.) shortage of key components due to supply disruptions; 3.) weak performance of the non-aviation business; 4.) expansion into less profitable business; and 5.) injection of weak assets by AVIC and other shareholders.

5.5 Valuation

AVIC Avionics has been the worst performing stock amongst the five covered in this Smartkarma Original. Its share price has come off by 51% in the last five years and remains as the weakest stock YTD, down by 6.7%. As a result, it is now trading at the lowest PER level in the last three years, but still at 36.9x for FY20F (Figure 86). Although the significant underperformance has put its valuation as undemanding relative to its historical range, we believe its comparatively less exposure towards the defense demand, competitive landscape, more complicated shareholding structure and the entrusted management arrangement with numerous connected transactions will stay as concerns. That said, we do not expect meaningful re-rating until they are resolved.

Figure 86: AVIC Avionics - P/E Band



Source: Wind

Global peer comparison

We take a look on the global aerospace and defense sector by examining the top 5 sector companies within the US, Europe, Asia and China, based on the list of DefenseNews Top 100 defense companies 2019, and compared with the five MSCI China A-share aerospace and defense companies covered in this Smartkarma Original (Figure 87). For full list of the DefenseNews Top 100 defense companies, please click here. The MSCI China A aerospace and defense companies, on average:

1. have higher proportion of their revenue derived from defense businesses (71%) than their European (50%) and Asian (60%) counterparts, but is similar to the average US peers (74%);
2. tend to have customers mostly related to the PLA and other Chinese government entities, but its global peers have a more diversified customer base and do not rely on their own government demand as significant as the Chinese companies;
3. have a smaller portion of export business than their global peers; domestic revenue, on average, accounted for over 95% of their total revenue. Hence, their earnings drivers are still the demand from the local market;
4. are 20.3%, 83.7% and 93.9% smaller than the average for Asia, Europe and the US aerospace and defense companies, respectively, based on the 2018 revenue from defense business. In other words, the Chinese defense companies are still significantly smaller than their peers in other parts of the world;
5. recorded the slowest growth in defense revenue (+5.8%) in 2018 in the world, reflecting their high reliance on China's defense spending and limited export business. Their peers, however, have earnings drivers from both domestic and export demand;

6. have the lowest ROE of 6.1%, compared with 13.6% for Asia peers, 19.6% for European and 71.5% for the US. Although some extreme high/low ROE of individual companies in Europe and US have distorted the average, the ROE for their Chinese counterparts are still generally lower. We believe this reflects that many of the listed A-share companies in the sector are still in the process of evolving from traditional SOEs to the more commercialised public companies, and this has dragged down their performance in ROE.
7. have P/B in the middle of the range of their peers. Chinese A-shares have average P/B of 3.9x, versus 2.1x for Asia, 3.7x for Europe and 7.3x for the US. This also aligns closer to their low ROEs, but to a certain extent, reflects the future growth prospects and asset injection potential; and
8. have their parents (unlisted group SOE) significantly bigger than the listed companies. Average defense revenue for the big unlisted aerospace and defense central SOEs (US$14.8bn) is 6.6x more than the listed companies (US$1.9bn), suggesting still a large portion of the defense businesses are in the hands of their parents and asset injections from these SOE groups will be a major growth engine for the listed companies in the future.

Figure 87: Global aerospace and defense companies comparison

Global rank	Company	Country	2018 Defense revenue (US$ m)	Defense revenue YoY change	% of revenue from defense	Latest FY ROE	Latest FY P/B
1	Lockheed Martin (LMT US)	US	50,536	+5%	94%	207.8%	30.3x
2	Boeing Co (BA US)	US	34,050	+66%	34%	NA	-8.4x
3	Northrop Grumman (NOC US)	US	25,300	+17%	84%	25.3%	6.0x
4	Raytheon Company (RTN US)	US	25,164	+7%	93%	27.4%	4.7x
6	General Dynamics (GD US)	US	24,055	+23%	66%	25.7%	3.8x
	Average for US		**31,821**	**+23.6%**	**74%**	**71.5%**	**7.3x**
7	BAE Systems PLC (BA/ LN)	UK	22,477	+0%	91%	27.5%	3.0x
9	Airbus Group SE (AIR FP)	Netherlands	13,064	+17%	17%	NA	14.0x
13	Leonardo SpA (LDO IM)	Italy	9,829	+11%	68%	11.6%	0.6x
16	Thales SA (HO FP)	France	9,576	+7%	51%	19.8%	2.6x
24	Rolls-Royce Holdings (RR/ LN)	UK	4,682	+1%	23%	NA	-1.8x
	Average for Europe		**11,926**	**+7.2%**	**50%**	**19.6%**	**3.7x**
27	Hanwha Corporation (000880 KS)	Korea	4,281	+10%	10%	1.3%	0.5x
43	Hindustan Aeronautics (HNAL IN)	India	2,755	+1%	94%	20.9%	1.6x
48	ST Engineering (STE SP)	Singapore	2,100	-9%	31%	23.6%	4.5x
54	Korea Aerospace (047810 KS)	Korea	1,694	+72%	67%	17.8%	2.6x

61	LIG Nex1 Co (079550 KS)	Korea	1,341	-14%	100%	4.2%	1.1x
	Average for Asia		**2,434**	**+12.0%**	**60%**	**13.6%**	**2.1x**
#	Avic Shenyang Aircraft (600760 CH)	China	2,790	+9%	98%*	10.1%	5.3x
#	AECC Aviation Power (600893 CH)	China	2,493	+2%	77%*	3.8%	1.9x
#	Avic Aircraft Co Ltd (000768 CH)	China	3,220	+8%	68%*	3.4%	2.9x
#	China Spacesat Co Ltd (600118 CH)	China	531	+3%	50%*	5.9%	6.7x
#	China Avionics Systems (600372 CH)	China	663	+7%	62%*	7.1%	3.0x
	Average for China		**1,939**	**+5.8%**	**71%**	**6.1%**	**3.9x**
5	AVIC (unlisted group SOE)	China	24,902	+9%	38%	NA	NA
8	NORINCO (unlisted group SOE)	China	14,778	+4%	22%	NA	NA
10	CASIC (unlisted group SOE)	China	12,131	+8%	32%	NA	NA
11	CSGC (unlisted group SOE)	China	11,963	-15%	31%	NA	NA
12	CETC (unlisted group SOE)	China	10,276	+8%	31%	NA	NA
	Average for unlisted China		**14,810**	**+2.8%**	**31%**		

Note:* % of defense revenue not disclosed, estimated value. # listed companies are not ranked as their revenue is reflected in the unlisted group SOE calculation. Source: DefenseNews2019, finance.yahoo.com, Company data

Conclusion

The Chinese aerospace and defense sector is still in the early stage of development when compared with their global peers. However, China's continued growth in defense spending, the increase in commercial use of defense technology and potential asset injection and corporate restructuring are important drivers for their earnings prospects. Although the profitability of the sector companies, on average, is still low, we see room for them to improve going forward. Relative to their international peers, we believe their valuations do not appear too expensive. With the heightened US-China political tension, there will be increase in the market interest in the sector, in our view. The removal of the QFII and RQFII quota is also expected to arouse more interest from the foreign institutional investors, as this is a Chinese sector which lacks presence in the offshore equity markets.

Our intention for this Smartkarma Original is to provide basic investment thesis on the sector and the five individual companies covered. We expect to publish more detailed Insights on these companies in the future to provide a more comprehensive analysis of this growing sector.

Note: All share prices and indices in this Smartkarma Original are based on closing on 22 May 2020.

Disclosure & Certification

- I/We have no position(s) in the any of securities referenced in this insight
- Views expressed in this insight accurately reflects my/our personal opinion(s) about the referenced securities and issuers and/or other subject matter as appropriate.
- This insight does not contain and is not based on any non-public, material information.
- To the best of my/our knowledge, the views expressed in this insight comply with Singapore law as well as applicable law in the country from which it is posted
- I/We have not been commissioned to write this insight or hold any specific opinion on the securities referenced therein
- I/We have signed the Insight Provider Agreement and this insight does not violate any of the terms specified therein.

— Osbert Tang, CFA (30 Apr 2020)

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Areas of Expertise

- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: Generalist
- Sectors: Generalist

Content Verticals

- Equity Bottom-Up, Thematic (Sector/ Industry)

Country Garden Services Holdings | Equity Bottom-Up

China Property Management - Sector Deep Dive and Evaluation Framework

By Sameer Taneja | 23 Jun 2020

EXECUTIVE SUMMARY

The China Property Management Sector is loved by investors for several reasons. The common thesis for investing in this space is :

- **Visible and High growth for a few years:** For most companies, profit growth is more than 30% CAGR over 3 years.
- **Asset Light Business Models:** ROE's over 20%.
- **M&A catalysts:** Most companies have just IPOed. They are cash-rich and can use their balance sheet to make favorable acquisitions.
- **Strong Working Capital, Cash Flow, and Balance sheets.**

The flip side is that a lot of these names have rallied (as you can see in the section **Great Shareholder Returns**) and have extremely high valuations. The average 1-year return for the names we look at in the sector has been 107%. We believe there is still upside in the universe of stocks to choose from in this space. In this insight, we will cover most of the HK listed names in the table below:

Company	Ticker	Price	Mkt cap (US$m)	PER 2019 (x)	PER FY20 (x)	PER FY21 (x)	PER FY22 (x)	3-Yr EPS CAGR (%)	PEG
Country Garden	6098 HK	37.25	13,234	54.2	41.6	30.6	22.9	33.2	1.3
A-Living Servi-H	3319 HK	43.15	7,423	42.8	30.4	23.4	18.6	32.0	0.9
Poly Property -H	6049 HK	82.65	5,901	62.3	55.7	40.4	29.4	28.4	2.0
Greentown Service	2869 HK	9.80	4,068	52.6	41.0	31.4	24.6	28.8	1.4
China Overseas	2669 HK	8.26	3,503	50.5	39.1	30.6	24.5	27.2	1.4
Ever Sunshine Life	1778 HK	12.74	2,746	79.7	49.0	32.1	22.1	53.4	0.9
S-Enjoy Service	1755 HK	21.40	2,259	57.4	38.1	26.6	19.4	43.6	0.9

Central China	9983 HK	9.27	1,489	43.0	27.9	18.4	13.6	42.0	1.2
Powerlong Commercial	9909 HK	17.56	1,408	36.4	34.5	23.8	17.6	27.5	1.3
Times Neighborhood	9928 HK	10.42	1,222	73.1	38.3	22.4	15.0	69.5	0.6
Sichuan Languang	2606 HK	55.80	1,282	16.4	15.2	11.5	8.7	23.4	0.6
Aoyuan Healthy Life	3662 HK	8.56	802	31.7	23.9	17.2	13.4	33.2	0.7
Colour Life Services	1778 HK	3.92	720	9.8	8.8	8.0	7.7	8.4	1.0
Binjiang Service	3316 HK	12.98	463	26.9	20.4	15.6	12.6	28.8	0.7
Adjusted Sector Avg*				**39.1**	**30.5**	**21.8**	**16.7**	**33.3**	**0.9**

source: Bloomberg

What's Original?

Most reports you will see on the sell-side will involve single stocks or initiating coverages on 4-5 names followed by a thesis on buying or selling them. What we've done here is used a compendium of 14 of the best names listed on the HKex and contrast them in a framework that is easy to understand. We've weighted each of these nine criteria equally. Readers may elect to weight each criterion differently but the essence of using this framework is that the more criteria that are met the more investible the stock is.

Nine Criteria Framework

1. Improving contracted GFA to GFA under management trend + supportive parent.
2. Third-party Growth Potential.
3. Listco balance sheet strength.
4. Parent balance sheet strength.
5. Margin improvement potential.
6. Incentivized management.
7. Reasonable valuations.
8. No Red flags.
9. Shareholder friendly actions like buybacks/dividends.

Putting these 9 points into a matrix for the stocks we get a table that ranks them. The companies in bold, are in our opinion the best names in the space.

Company	Ticker	1	2	3	4	5	6	7	8	9	Total
Country Garden S	6098 HK	**1**	**1**	**1**	**1**	**1**	**1**		**1**		**7**
A-Living Servi-H	**3319 HK**		**1**	**1**	**1**	**1**		**1**	**1**	**1**	**7**
Poly Property -H	6049 HK	1	1	1		1	1		1		6
Greentown Service	2869 HK	1	1	1	1		1		1		6
China Overseas P	2669 HK	1		1	1	1			1		5
Ever Sunshine Li	**1995 HK**	**1**	**1**	**1**	**1**		**1**	**1**	**1**		**7**
S-Enjoy Service	1755 HK	1		1	1		1	1		1	6
Central China Ne	9983 HK	1	1	1	1		1		1		6
Powerlong Commer	9909 HK	1		1	1		1		1	1	6
Times Neighborho	**9928 HK**	**1**	**1**	**1**	**1**	**1**		**1**	**1**		**7**
Sichuan Languang	**2606 HK**	**1**	**1**	**1**	**1**	**1**	**1**	**1**		**1**	**8**
Aoyuan Healthy L	3662 HK	1	1	1		1	1	1			6
Colour Life Serv	1778 HK				1			1	1		3
Binjiang Service	**3316 HK**	**1**		**1**	**1**		**1**	**1**	**1**	**1**	**7**

Based on the matrix if one adopts a mid-cap basket approach Languang Justbon Services (2606 HK), Times Neighborhood (9928 HK), and Ever Sunshine Lifestyle Services (1995 HK) are good names to own. A large-cap portfolio could consist of stocks like A-Living Services (3319 HK) and Country Garden Services Hold (6098 HK) with a greater weightage to the former.

For funds that make single stock purchases or having a small-cap inclination Binjiang Service Group (3316 HK) is an apt name to look at else, it also could be included in a basket of small and mid-caps.

In this insight, we will breakdown this nine criteria framework in detail.

Key Sections in this Insight

- Why Invest in China Property Management Companies (PMC's)?
- The PMC Business Model
- A Brief Summary of the Names
- Shareholder Returns in the Sector
- The nine criteria framework in detail
- More Opportunities and New Deals in the Space

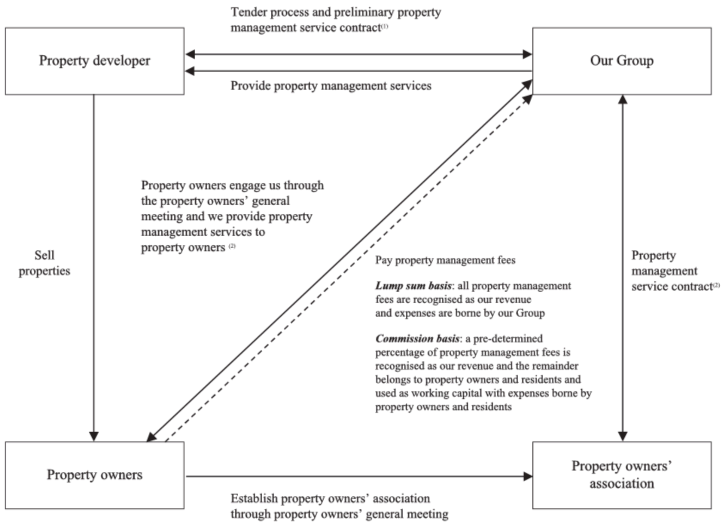
DETAIL

Why Invest in China Property Management Companies?

- Simple business models.
- Large investible set of names to choose from
- Great shareholder returns
- Simple Frameworks for Evaluating Investible Names in the Space
- Visible growth stories spanning several years.
- Balance sheet strength.
- M&A and event-driven upside.

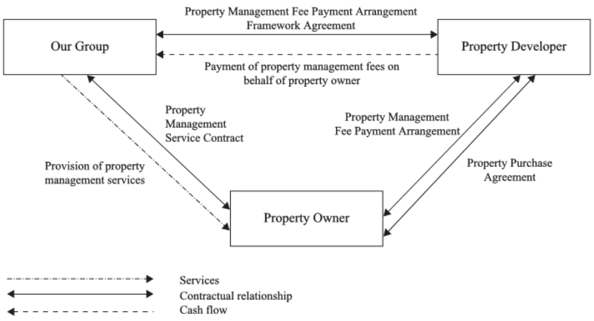
Simple Business Models

Revenue Model


Tender process and preliminary property management service contract(1)
Property developer
Our Group
Provide property management services
Sell properties
Property owners engage us through the property owners' general meeting and we provide property management services to property owners (2)
Pay property management fees
Lump sum basis: all property management fees are recognised as our revenue and expenses are borne by our Group
Commission basis: a pre-determined percentage of property management fees is recognised as our revenue and the remainder belongs to property owners and residents and used as working capital with expenses borne by property owners and residents
Property management service contract(2)
Property owners
Property owners' association
Establish property owners' association through property owners' general meeting

Source: Country Garden Property Management Services Prospectus

Cash Flows

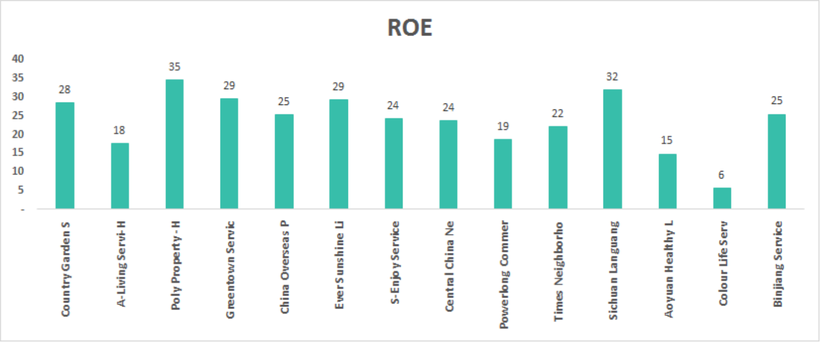

Property Management Fee Payment Arrangement Framework Agreement
Our Group
Property Developer
Payment of property management fees on behalf of property owner
Property Management Service Contract
Property Management Fee Payment Arrangement
Provision of property management services
Property Purchase Agreement
Property Owner
Services
Contractual relationship
Cash flow

Source: Country Garden Property Management Services Prospectus

These are very basic flowcharts above, depicting the business model and cash flow trail of all the property management service companies (PMC). If you open up a prospectus of any one of the companies listed in the executive summary above, you will see this. Typically, a PMC in China will have been spun off or be a separately listed group owned by the founder of a Property Developer or the Property developer itself (we refer to the developer as the parent group). When the developer acquires land, it initiates a tender process in which it invites several PMC's to bid for a contract on property management services. After submission and evaluation of the bids, the contract is awarded to a PMC(in most cases the property developer would give it to its PMC). Once the bid is won and services are initiated, payments are made on a lump sum or commission basis.

Why is this so special?

1. The contract once given out becomes a stable revenue base for the PMC (that will not decline unless there is government intervention).
2. If the property developer (in most cases termed the parent group) increases its landbank, there is more visibility on the PMC's ability to grow revenues.
3. In addition to this, the PMC can bid for third party projects to enhance its growth prospects and build on the base provided by its parent, or it could do M&A.
4. Besides labor and management oversight, no investment needs to be made by the PMC (in PP&E or land) making this is an asset-light model generating great ROE's and ROIC's.



Source: Bloomberg

Revenue Lines

PMC's have three major revenue streams. There could be more, but the three core ones are as follows:

1. **Property management services:** Property management fees are for providing security, cleaning, greening, gardening and repair, and maintenance services. It contributes to a majority of the revenue and has the lowest margins. The growth correlates with the increase in area under management.
2. **Community value-added services:** which includes home living services, real estate brokerageservices, and common area value-added services. The contribution to revenue is lower but it has higher growth and better margins.
3. **Value-added services to non-property owners:** these are consultancy services, pre-marketing, and pre-delivery cleaning services. The contribution to revenue is lower but it has higher growth and better margins.

Large Investible Set of Names

For the insight, we will cover in great detail the operating metrics, valuations, ownership, and key people involved in each of these 14 names. There is a large set of names to cover here so we will just provide a brief summary of stocks that should be part of the basket.

The Bellwether Large Caps

Country Garden Services Hold (6098 HK)

The largest listed property management company. It has over 2400 projects and a nationwide presence. Backed by a strong parent Country Garden Holdings Co (2007 HK) with a massive landbank, the company has 685 mn sqm of contracted GFA with 60-70 mn sqm in the pipeline just from the parent. Recently, the company has started to take on SOE projects as demonstrated by their 85 mn sqm contract with Petrochina, called "Three Supplies Management". It is impressive that despite being such a big company the guidance is for profit growth of 35-40% CAGR over the next 3 years.

A-Living Services (3319 HK)

The second-largest listed name on the HKEx in terms of market capitalization, the company had 234 mn sqm of managed GFA and 356 mn sqm of contracted GFA. As an active M&A participant, it recently completed an acquisition of CMIG (China Mingsheng Investment Property Group) and consolidated another 154 mn sqm of GFA. This acquisition would catapult their managed GFA to over 400 mn sqm and make them a top 3 PMC. Backed by a reputable parent, Agile Property Holdings (3383 HK) the company has embarked on a high growth trajectory guiding >30% CAGR profit growth over the next 3 years.

The High Growth Mid Caps

Languang Justbon Services (2606 HK)

They are the leading property management service provider in Southwest China and Sichuan Province with a fast growth track record. At the end of 2019, they had 117 mn sqm of contracted GFA showing a 40% growth. There were recent concerns around management leaving and lesser than expected M&A (which is expected to fuel their growth). With the arrival of a new CEO from CMIG (Which was acquired by A-Living Services (3319 HK), the company is beginning to slowly win the trust and confidence of investors. Of the managed GFA of 71 mn sqm, 30 mn sqm is from the Sichuan Languang Development (600466 CH), and the parent will only contribute 5-6 mn of managed GFA to the company every year implying huge M&A and third party growth.

Ever Sunshine Lifestyle Services (1995 HK)

Ever Sunshine Lifestyle Services Group was founded in 2002 and is the property management arm of CIFI Holdings (0884.HK). It was listed on the Hong Kong Stock Exchange in Dec-18. As of Dec-19, Ever Sunshine was owned as to c.47% by Mr. Lin Feng & family and 21.5% by CIFI. They manage 65msm GFA from over 400 projects in 78 cities and have an additional 45msm GFA reserve (total contracted GFA of 110.6msm). It is a national top-15 property management company. The equity fundraising of HK$1.58bn (over and above the 2019 net cash: Rmb1.28bn) recently indicates more M&A activity ahead. The management has guided a target of 10 times profit growth by ‘23E (vs.’18) placing it at 10x PE FY23, with a strategic “5221” path for 50%/20%/20%/10% of GFA via third-party/ partnership/ CIFI/ M&A.

Times Neighborhood (9928 HK)

Times Neighborhood is a property management service provider backed by Times China (1233.HK), founded in 1998 and listed on the Hong Kong Stock Exchange in Dec-19. It is 50.6% owned by Mr. Shum Chiu Hung, the chairman of Times China. The PMC is focused on the Greater Bay Area (85% of managed GFA). It has embarked on an M&A fuelled growth trajectory and guides that it will go from 45 mn sqm of current managed GFA to 100 mn of GFA by 2021. The company is very clear in its guidance of achieving >220 mn RMB of profit for 2020 and >350 mn RMB for FY21. It has the lowest PEG of 0.5x amongst its peers due to its high growth. The company has stated that it will not raise capital for the next 2-3 years.

The Solid Small Cap

Binjiang Service Group (3316 HK)

Binjiang Service Group Co Ltd (3316 HK) is a property management service company that focuses on high-end residential properties. It was established in 1996 as a local residential property management service provider in Hangzhou, Zhejiang Province. They are one of the leading property management service providers for high-end properties in the Yangtze River Delta region. As at the end of 2019, it manages 72 residential properties and 27 nonresidential properties primarily in Hangzhou, and outside of Hangzhou but still in Zhejiang Province. In 2018 they were ranked 32nd among the top 100 property management companies by China Real Estate Top 10 and CIA. We have written in great detail about this in our insight, Binjiang Service Group: A Solid Property Management Service Company.

Great Shareholder Returns

If you have been involved in this sector for a year and have invested in any of the bellwether names, you would have doubled your investment. For names that have listed more recently like Powerlong Commercial Management Holdings (9909 HK), Times Neighborhood (9928 HK), and Languang Justbon Services (2606 HK) returns have also been very good.

Ticker	Name	1 mth	3 mth	6 mth	1 year
6098 HK Equity	Country Garden S	5%	28%	44%	114%
3319 HK Equity	A-Living Servi-H	7%	27%	69%	232%
6049 HK Equity	Poly Property -H	4%	38%		
2869 HK Equity	Greentown Service	-6%	14%	22%	56%
2669 HK Equity	China Overseas	1%	33%	65%	98%
1995 HK Equity	Ever Sunshine Life	13%	83%	165%	262%
1755 HK Equity	S-Enjoy Service	10%	57%	89%	163%
9983 HK Equity	Central China				
9909 HK Equity	Powerlong Commercial	21%	60%		
9928 HK Equity	Times Neighborho	29%	83%		

2606 HK Equity	Sichuan Languang	43%	60%	16%	
3662 HK Equity	Aoyuan Healthy Life	4%	32%	53%	90%
1778 HK Equity	Colour Life Services	9%	21%	-7%	-22%
3316 HK Equity	Binjiang Service	10%	29%	93%	80%
Average Return		**12%**	**43%**	**55%**	**107%**

Source: Bloomberg

The question is if you were to buy this sector now what would be the right approach?

1) Single Stock

2) Basket Approach (leaning towards the bellwethers)

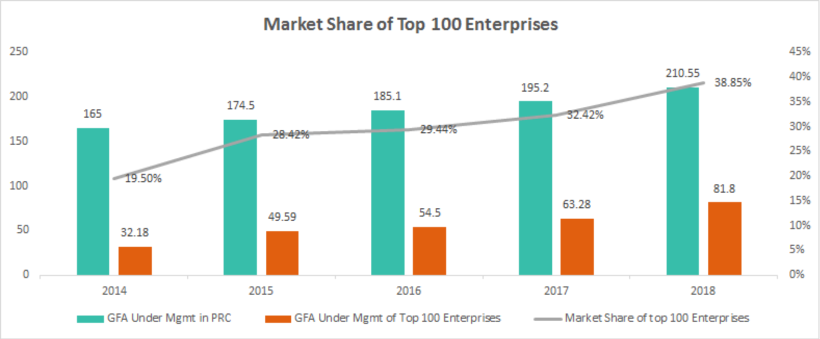
Most of the stocks in this space have recently listed. They have short track records and we would strongly advocate playing this sector with a basket approach. How would you go about selecting your basket? We believe we should adhere to a framework and not invest merely by what valuations dictate.

A Nine Criteria Framework to select the best names in the sector

1. Improving contracted GFA to GFA under management trend + supportive parent
2. Third-party Growth Potential
3. Listco balance sheet strength
4. Parent balance sheet strength
5. Margin improvement potential
6. Incentivized management
7. Reasonable valuations.
8. Red flags.
9. Shareholder friendly actions like buybacks/dividends

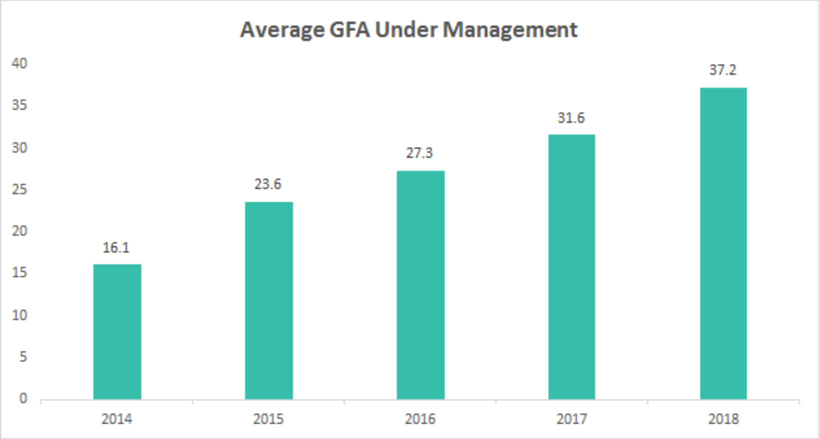
Improving Contracted GFA to GFA Under Management Trend

The selling point of PMC's is its long and visible growth stories. If you are a large company and have a strong balance sheet chances are you will grow faster than the market. This is shown in the chart below :



Source: CIA

Statistics from the CIA (China Index Academy) show that the top 100 PMC's have grown their landbank on average by 23% CAGR.



Source: CIA

The GFA under management, the revenue growth, and the profit growth have grown 16.8%,18.8%, and 25% CAGR respectively for the top 100 companies from 2016 to 2018.

The contracted GFA to the GFA under management trend

What is Contracted GFA? Why is Contracted GFA / GFA under management Important?

The contracted GFA is the sum of the property managed by the PMC's (contributing to revenue) and the GFA which has been reserved (a future contributor to revenue). The larger the ratio of Contracted GFA / GFA under management, the more visible the pipeline of growth for the company.

Contracted / Managed GFA		12/15a	12/16a	12/17a	12/18a	12/19a
Country Garden Mgmt Svcs	**6098 HK**	**2.3**	**2.3**	**2.7**	**2.8**	**2.5**
A Living	3319 HK	1.8	1.5	1.6	1.7	1.5
Sichuan Languang Justbon	2606 HK		1.2	1.2	1.2	1.6
Greentown Property Mgmt Svcs	2869 HK	2.1	2.1	2.1	2.1	2.1
Binjiang Property Mgmt Svcs	**3316 HK**	**1.5**	**1.5**	**1.6**	**1.8**	**1.9**
S Enjoy	**1755 HK**	**1.7**	**1.7**	**1.9**	**2.6**	**2.5**
Poly Property -H	6049 HK		1.7	1.7	1.9	1.7
China Overseas P	2669 HK		NA	NA	NA	NA
Ever Sunshine Lifestyle Svcs	1995 HK	1.6	1.4	1.3	1.6	1.7
Central China Ne	9983 HK			1.7	2.7	2.0
Powerlong Commer	9909 HK		1.1	1.2	1.3	1.5
Times Neighborho	9928 HK		1.2	1.2	1.5	1.2
Aoyuan Healthy Lifestyle Svs	3662 HK		NA	NA	NA	NA
Colour Life Services	1778 HK		1.7	1.5	1.5	1.5

Source: Company Filings

There are two things to note for an investor looking at this table

1) **A contracted GFA that is > 2** implies that the company has a clear path towards doubling its revenues. The period of execution is an important factor in this. Company's with the most visible pipeline are :

- Country Garden Services Hold (6098 HK)
- Greentown Service Group (2869 HK)
- S-Enjoy Service Group Co Ltd (1755 HK)
- Binjiang Service Group (3316 HK)
- Central China New Life (9983 HK)

2) **An improving contracted GFA to GFA under management trend indicates the company** is improving its visibility on revenue growth. Company's showing an improving trend of GFA contracted to GFA under management are :

- S-Enjoy Service Group Co Ltd (1755 HK)
- Binjiang Service Group (3316 HK)
- Ever Sunshine Lifestyle Services (1995 HK)

Third-Party + M&A Growth Potential

Contracted GFA is generally from two sources :

1. The Parent
2. Third-Party and M&A

Whilst it is good to have a supportive parent, an over-reliance on them is not healthy. Below is the list of M&A and third party contributions to GFA's.

Third-Party M&A GFA Contribution(%)	Ticker	12/15a	12/16a	12/17a	12/18a	12/19a
Country Garden Mgmt Svcs	6098 HK	3%	4%	11%	20%	29%
A Living	**3319 HK**	**16%**	**32%**	**43%**	**61%**	**73%**
Sichuan Languang Justbon	**2606 HK**		**22%**	**45%**	**56%**	**59%**
Greentown Property Mgmt Svcs	**2869 HK**	**78%**	**78%**	**78%**	**79%**	**81%**
Binjiang Property Mgmt Svcs	3316 HK	5%	10%	21%	29%	33%
S Enjoy	1755 HK	4%	24%	28%	29%	29%
Poly Property -H	**6049 HK**		**8%**	**14%**	**43%**	**55%**
China Overseas P	2669 HK	6%	6%	5%	8%	9%
Ever Sunshine Lifestyle Svcs	**1995 HK**	**11%**	**28%**	**50%**	**64%**	**73%**
Central China Ne	9983 HK			9%	16%	31%
Powerlong Commer	9909 HK		23%	14%	11%	13%
Times Neighborho	**9928 HK**		**23%**	**25%**	**29%**	**63%**
Aoyuan Healthy Lifestyle Svs	3662 HK	0%	0%	0%	5%	8%

Source: Company Filings

Company's with a growth profile based on M&A and third party contributions are:

1. A-Living Services (3319 HK)
2. Languang Justbon Services (2606 HK)
3. Poly Property Development (6049 HK)
4. Ever Sunshine Lifestyle Services (1995 HK)
5. Times Neighborhood (9928 HK)

Higher Third Party and Managed GFA Contribution Correlates with Faster GFA Growth

Managed GFA Growth YoY(%)

Managed GFA	Ticker	12/16a	12/17a	12/18a	12/19a	CAGR
Country Garden Mgmt Svcs	6098 HK	30%	35%	48%	52%	41%
A Living	**3319 HK**	**43%**	**56%**	**76%**	**69%**	**61%**
Sichuan Languang Justbon	**2606 HK**		**82%**	**38%**	**18%**	**44%**
Greentown Property Mgmt Svcs	2869 HK	27%	31%	24%	25%	27%
Binjiang Property Mgmt Svcs	3316 HK	25%	25%	35%	23%	27%
S Enjoy	1755 HK	42%	32%	18%	40%	33%
Poly Property -H	6049 HK		30%	79%	51%	39%
China Overseas P	2669 HK	12%	10%	10%	7%	10%
Ever Sunshine Lifestyle Svcs	**1995 HK**	**65%**	**64%**	**52%**	**62%**	**61%**
Central China Ne	9983 HK			26%	122%	67%
Powerlong Commer	9909 HK		6%	4%	12%	7%
Times Neighborho	**9928 HK**		**23%**	**17%**	**148%**	**53%**

Aoyuan Healthy Lifestyle Svs	3662 HK	36%	21%	21%	45%	31%
Colour Life Services	1778 HK		28%	24%	2%	17%

Source: Company Filings

It is no surprise that companies, where the rate in increase of contribution from M&A and Third-Party are the highest, are also the fastest growers in terms of their managed GFA.

Which are the company's active in the M&A space so far in 2020?

Company	Ticker HK	Date	Target	Interest Acquired	Consideration (mn RMB)	GFA managed (mn sqm)	2019 Profit (mn RMB)	PE(x)
Aoyuan Healthy L	3662	05-Jun-20	Easy Life Smart Community Beijing Ltd NEEQ: 837249	80%	247	22.0	23	13.4
Aoyuan Healthy L	3662	11-May-20	Ningbo City	65%	37	2.4	3	19.0
Times Neighborho	9928	11-May-20	Guangzhou Yaocheng PMC	100%	15	2.4	2	9.3
S-Enjoy	1755	07-May-20	Tiber Xingchengyue	62%	104	5.2	16	10.4
Times Neighborho	9928	23-Mar-20	Guangzhou Haoqing PMC	100%	33	3.2	4	8.8
Eversunshine Life	1995	27-Feb-20	Shanghai Yongsheng	50%	9	2	4	4.8
A-Living Servi-H	3319	11-Feb-20	CMIG PM	60%	1560	154	210	12.4

Listco Balance Sheet Strength

Most PMC's have recently raised money in IPO's for acquisitions. There have also been some equity raisings by Greentown Service Group (2869 HK) and Ever Sunshine Lifestyle Services (1995 HK) recently. Below is a table with the gearing ratios of the PMC's in the listed HK universe :

Company	**Ticker**	**Mkt Cap**	**Net Cash**	**Net Gearing**	**Net Cash% Mkt Cap**
Country Garden Svcs	6098 HK	93,239	8,195	-144%	9%
A-Living Servi-H	3319 HK	52,300	4,626	-71%	9%
Poly Property -H	6049 HK	41,573	6,508	-127%	16%
Greentown Svcs	2869 HK	28,658	4,568	-85%	16%
China Overseas	2669 HK	24,680	2,495	-163%	10%
Ever Sunshine Life	1995 HK	19,345	2,825	-102%	15%
S-Enjoy Service	1755 HK	15,915	1,339	-139%	8%
Central China	9983 HK	10,491	2,325	-110%	22%
Powerlong Commercial	9909 HK	9,921	2,616	-165%	26%
Times Neighborhood	9928 HK	8,607	972	-109%	11%
Sichuan Languang	2606 HK	9,034	1,962	-87%	22%

Aoyuan Healthy Life	3662 HK	5,651	722	-85%	13%
Colour Life Serv	1778 HK	5,070	(469)	12%	-9%
Binjiang Service	3316 HK	3,261	1,083	-149%	33%

Source: Company Filings 2019, Cash, Mkt Cap figures in mn RMB.

Note:

a) for Greentown Service Group (2869 HK) and Ever Sunshine Lifestyle Services (1995 HK) recent capital raises have been included to reflect changes in cash and debt-equity

b) for Aoyuan Healthy Life Group Co (3662 HK) a recent acquisition has been included to reflect a change in the net cash position.

c) For A-Living Services (3319 HK) the acquisition of CMIG will take the net cash position down further to 3.1 bn RMB. Making it lesser net cash.

As you can see from the table above, barring Colour Life Services (1778 HK), all companies are net cash. This provides all of them with ample opportunities for M&A as well as corporate-friendly actions like buybacks and increasing dividend payout ratios.

Parent Balance Sheet Strength

The strength of the parent company is very important. A weak parent co balance sheet would constrain them (the parentco) from acquiring landbank, which could be a future revenue source for the listco. Also in the short term, since the property developer pays the list co in some cases, it could affect the working capital cycle of the list co as well.

The table below has the gearing of the parent company's of all the property developers under coverage:

Company	Ticker	Mkt Cap USD mn	Parent	Parent Ticker	Mkt Cap USD mn	Gearing (%)
Country Garden S	6098 HK	13,234	Country Garden	2007 HK	28,278	52
A-Living Servi-H	3319 HK	7,423	Agile Group Hold	3383 HK	4,710	96
Poly Property -H	6049 HK	5,901	Poly Property	119 HK	1,200	106
Greentown Service	2869 HK	4,068	Greentown China	3900 HK	2,616	69
China Overseas	2669 HK	3,503	China Overseas	688 HK	35,764	33
Ever Sunshine Life	1995 HK	2,746	Cifi Holdings Gr	884 HK	6,732	68
S-Enjoy Service	1755 HK	2,259	Seazen Group Ltd	1030 HK	5,873	47
Central China	9983 HK	1,489	Central China	832 HK	1,368	73

Powerlong Commercial	9909 HK	1,408	Powerlong Real	1238 HK	2,453	90
Times Neighborho	9928 HK	1,222	Times China Hold	1233 HK	3,763	80
Sichuan Languang	2606 HK	1,282	Sichuan Langua-A	600466 CH	2,299	89
Aoyuan Healthy Life	3662 HK	802	China Aoyuan Gro	3883 HK	3,463	101
Colour Life Services	1778 HK	720	Fantasia Holding	1777 HK	1,109	81
Binjiang Service	3316 HK	463	Hangzhou Binj-A	002244 CH	1,875	90

Source: Company Filings 2019, Bloomberg

Most of the listcos have parents with really high gearing. The ones with favorable gearing ratios are:

1. China Overseas Property Holdings (2669 HK)
2. S-Enjoy Service Group Co Ltd (1755 HK)
3. Country Garden Services Hold (6098 HK)

We would assign a greater probability of the parent being able to support these companies by growing their landbank. It is interesting to note that for company's like A-Living Services (3319 HK), Poly Property Development (6049 HK), Greentown Service Group (2869 HK), and Central China New Life (9983 HK), their market capitalization exceeds that of the parent group. This shows you how much market capitalization the sector has created.

Margin Improvement Potential

Margin Improvement for companies can come from several factors :

1. Improving the revenue mix with a greater contribution from value-added services.
2. Cost reductions
3. Bedding down of acquisitions and introducing M&A related synergies.

We will just touch on the potential for improving margins which involve the improvement in revenue mix.

Value-added Services (VAS) as a % of Revenue

Company	Ticker	2017	2018	2019
Country Garden S	**6098 HK**	**18%**	**26%**	**24%**
A-Living Servi-H	3319 HK	32%	52%	45%
Poly Property -H	**6049 HK**	**25%**	**31%**	**36%**
Greentown Service	**2869 HK**	**31%**	**34%**	**36%**
China Overseas P	**2669 HK**	**8%**	**21%**	**25%**
Ever Sunshine Li	**1995 HK**	**35%**	**38%**	**43%**

S-Enjoy Service	1755 HK	33%	38%	58%
Central China Ne	9983 HK	28%	39%	66%
Powerlong Commer	9909 HK	19%	18%	18%
Times Neighborho	**9928 HK**	**36%**	**42%**	**37%**
Sichuan Languang	2606 HK	37%	39%	46%
Aoyuan Healthy L	**3662 HK**	**19%**	**24%**	**28%**
Colour Life Serv	1778 HK	17%	11%	10%
Binjiang Service	3316 HK	38%	38%	41%

Source: Company Filings 2017-19

For the company's like :

1. Country Garden Services Hold (6098 HK)
2. Poly Property Development (6049 HK)
3. Greentown Service Group (2869 HK)
4. China Overseas Property Holdings (2669 HK)
5. Ever Sunshine Lifestyle Services (1995 HK)
6. Languang Justbon Services (2606 HK)

there is a clear trend of increasing VAS contribution, which is positive. For company's like S-Enjoy Service Group Co Ltd (1755 HK) and Central China New Life (9983 HK), the contribution of VAS is already extremely high (this makes the likelihood of growth in margins difficult from VAS). Due to acquisitions, in company's like A-Living Services (3319 HK) and Times Neighborhood (9928 HK), the overall contribution of revenue from VAS has fallen but the scope for increase in contribution from their acquisition targets could lead to a trend of improving margins.

The table below illustrates the GP Margins of Company's vs their respective VAS margins

		GP Margin VAS (%)			GP Margin Company (%)		
Company	**Ticker**	**2017**	**2018**	**2019**	**2017**	**2018**	**2019**
Country Garden S	6098 HK	49%	54%	51%	33%	38%	32%
A-Living Servi-H	3319 HK	48%	48%	51%	34%	38%	37%
Poly Property -H	6049 HK	30%	33%	31%	18%	20%	20%
Greentown Service	2869 HK	35%	31%	30%	18%	18%	18%
China Overseas P	2669 HK	54%	34%	31%	24%	20%	20%
Ever Sunshine Li	1995 HK	39%	42%	39%	25%	29%	30%
S-Enjoy Service	1755 HK	34%	32%	30%	28%	29%	30%
Central China Ne	9983 HK	42%	35%	42%	23%	23%	33%
Powerlong Commer	9909 HK	NA	NA	NA	26%	27%	26%
Times Neighborho	9928 HK	36%	32%	32%	25%	27%	28%
Sichuan Languang	2606 HK	47%	42%	46%	36%	33%	36%
Aoyuan Healthy L	3662 HK	NA	NA	NA	34%	34%	37%
Colour Life Serv	1778 HK	NA	NA	NA	45%	35%	35%
Binjiang Service	3316 HK	43%	44%	45%	26%	26%	28%

*Source: Company Filings + Prospectus's, *for Aoyuan/Powerlong and Colorlife data is not available*

GP Contribution (%)				
Company	**Ticker**	**2017**	**2018**	**2019**
Country Garden S	6098 HK	27%	37%	38%
A-Living Servi-H	3319 HK	45%	66%	62%
Poly Property -H	6049 HK	43%	52%	55%
Greentown Service	2869 HK	58%	58%	60%
China Overseas P	2669 HK	18%	36%	39%
Ever Sunshine Li	1995 HK	53%	55%	57%
S-Enjoy Service	1755 HK	41%	41%	60%
Central China Ne	9983 HK	52%	60%	84%
Powerlong Commer	9909 HK	NA	NA	NA
Times Neighborho	9928 HK	52%	49%	43%
Sichuan Languang	2606 HK	48%	48%	58%
Aoyuan Healthy L	3662 HK	NA	NA	NA
Colour Life Serv	1778 HK	NA	NA	NA
Binjiang Service	3316 HK	62%	63%	66%

Source: Company Filings

Incentivized Management

We believe that incentivized management is very crucial in high growth companies that are on the cusp of undertaking major M&A. For the list of companies, we have identified the key personnel (involved in operations) and how they have been incentivized. We look into the equity holdings of the key personnel as well as if there is a share option scheme. Some of the companies on the list are exploring these options (for e.g Times Neighborhood (9928 HK) and Binjiang Service Group (3316 HK)) but they currently do not have them.

President and CEO Compensation

Company	Ticker	Key Person	Designation	Holding in the company	USD mn	Mkt Cap	Share Option Scheme
Country Garden S	6098 HK	Li Changjiang	President	0.48%	62	12,879	Yes
A-Living Servi-H	3319 HK	Huang Fenghao	CEO	6.00%	436	7,260	No
Poly Property -H	6049 HK	Li Jiahe	Executive Director	0.02%	1	5,958	Yes
Greentown Service	2869 HK	Yang Zhangfa	CEO	2.15%	88	4,084	Yes
China Overseas	2669 HK	Yang Ou	CEO	0.00%	-	3,406	No
Ever Sunshine Life	1995 HK	Zhou Hongbin	President	1.91%	44	2,280	Yes
S-Enjoy Service	1755 HK	Qi Xiaoming	Chairman CEO	0.37%	8	2,107	Yes
Central China	9983 HK	Wang Jun	Chairman CEO	3.59%	55	1,539	Yes
Powerlong Commer	9909 HK	Hoi Wah Fong	Chairman	7.50%	104	1,387	Yes
Times Neighborho	9928 HK	Wang Meng	CEO	0.00%	-	1,161	No
Sichuan Languang	2606 HK	Yao Min	Chairman	6.13%	81	1,316	Yes
Aoyuan Healthy L	3662 HK	Su Bo	President	0.00%	-	784	Yes
Colour Life Serv	1778 HK	Huang Wei	CEO	0.04%	0	742	Yes
Binjiang Service	3316 HK	Zhu Lidong	Chairman and CEO	12.89%	61	471	No

Source: Company Filings

Reasonable Valuations

Company	**Ticker**	**Price**	**Mkt cap (US$m)**	**PER 2019 (x)**	**PER FY20 (x)**	**PER FY21 (x)**	**PER FY22 (x)**	**3-Yr EPS CAGR (%)**	**PEG**
Country Garden Svc	6098 HK	37.25	13,234	54.2	41.6	30.6	22.9	33.2	1.3
A-Living Servi-H	**3319 HK**	**43.15**	**7,423**	**42.8**	**30.4**	**23.4**	**18.6**	**32.0**	**0.9**
Poly Property -H	6049 HK	82.65	5,901	62.3	55.7	40.4	29.4	28.4	2.0
Greentown Service	2869 HK	9.80	4,068	52.6	41.0	31.4	24.6	28.8	1.4

China Overseas P	2669 HK	8.26	3,503	50.5	39.1	30.6	24.5	27.2	1.4
Ever Sunshine Life	**1778 HK**	**12.74**	**2,746**	**79.7**	**49.0**	**32.1**	**22.1**	**53.4**	**0.9**
S-Enjoy Service	**1755 HK**	**21.40**	**2,259**	**57.4**	**38.1**	**26.6**	**19.4**	**43.6**	**0.9**
Central China Ne	9983 HK	9.27	1,489	43.0	27.9	18.4	13.6	42.0	1.2
Powerlong Commercial	9909 HK	17.56	1,408	36.4	34.5	23.8	17.6	27.5	1.3
Times Neighborhood	**9928 HK**	**10.42**	**1,222**	**73.1**	**38.3**	**22.4**	**15.0**	**69.5**	**0.6**
Sichuan Languang	**2606 HK**	**55.80**	**1,282**	**16.4**	**15.2**	**11.5**	**8.7**	**23.4**	**0.6**
Aoyuan Healthy Life	**3662 HK**	**8.56**	**802**	**31.7**	**23.9**	**17.2**	**13.4**	**33.2**	**0.7**
Colour Life Serv	1778 HK	3.92	720	9.8	8.8	8.0	7.7	8.4	1.0
Binjiang Service	**3316 HK**	**12.98**	**463**	**26.9**	**20.4**	**15.6**	**12.6**	**28.8**	**0.7**
Adjusted Sector Avg*				**39.1**	**30.5**	**21.8**	**16.7**	**33.3**	**0.9**

source: Bloomberg

PE valuations should never be the bedrock of a thesis on investing in this space. It should only be married to the company's having good growth. In this regard, the company's that stand out are the mid-caps namely,

1. Times Neighborhood (9928 HK)
2. Languang Justbon Services (2606 HK)
3. Binjiang Service Group (3316 HK)
4. S-Enjoy Service Group Co Ltd (1755 HK)
5. Ever Sunshine Lifestyle Services (1995 HK)
6. Aoyuan Healthy Life Group Co (3662 HK)

Amongst the larger names, A-Living Services (3319 HK) is cheap on valuation.

No Red Flags

This is a new sector and red flags are not well researched. Potential shareholders should be wary of issues or stigmas associated with groups and companies. We will elaborate on some specific instances of issues companies face.

S-Enjoy Service Group Co Ltd (1755 HK) Chairman

The former chairman of the parent group has been recently sentenced to five years in prison on charges of pedophilia (see link: chairman sentence). While he was stripped of all positions in the company when the allegations were made and his son is now in charge of the group, the image of the company is tarnished. S-Enjoy scores well on most counts in the framework but this in our opinion is a big red flag.

Aoyuan Healthy Life Group Co (3662 HK) Purchase of Land Use Rights

On the 12th of December 2019, Aoyuan purchased land use rights of a plot in the Fengxian District, Shanghai City. They spent 82 mn RMB for 75,000 sqm of above-ground construction area (or roughly 1100 RMB/sqm). The listco was able to get this land use right cheap from the government because it positioned itself as a company that was engaged in research of the health and beauty industry. The State Council issued the “Healthy China 2030” blueprint and outlined the strategy of a “Healthy China”. In particular, the beauty and health industry, which is a crucial part of the health industry, shall integrate into the national key strategy. The “Comments on Promoting the Development of Beauty and Health Industry in Shanghai” issued by the Shanghai Municipal Government echoed with the above national policy. The Land-Plot will be developed into a healthcare and medical beauty industrial complex, including the establishment of regional headquarters of the general health and wellness industry, technology incubator center of the general health and wellness, medical beauty flagship store, research, and development center for medical beauty products, display center for medical beauty products, experience center and talent training center in such industrial complex.

Aoyuan would sell the land use rights to its parent in an arms-length transaction as it is not a property developer (the parent would have had to pay 5x the amount if it had directly purchased these rights). While this sounds accretive only to the parent, the company claims it could benefit commercially by sharing a percentage of the profits in this development.

Will Aoyuan engage in more connected party transactions like these?

In our humble opinion, being a front for purchasing land cheaply for its parent's use is a red flag.

Times Neighborhood (9928 HK) aborted purchase of a Microfinance Company

This is a case where Times Neighborhood (9928 HK) listened to concerns of its shareholders and abandoned a transaction that did not involve the core business. This could be interpreted as positive.

Times Neighborhood (9928 HK) on the 9th of April 2020, was about to purchase a 70% stake in micro-credit company, Guangzhou Times Rongxin Micro-Credit owned by the parent for 142 mn RMB or about 15% of the cash on their balance sheet. Times Neighborhood (9928 HK) has positioned itself as an M&A growth fuelled company that will grow managed GFA from 46 mn sqm in 2019 to 100 mn sqm by 2021 of which M&A would contribute 75% of the growth. Why would they spend on a micro-credit company?

In this situation, shareholders voiced their concerns and the company abandoned the transaction.

Languang Justbon Services (2606 HK) Exodus of Management

Languang Justbon Services (2606 HK) experienced an exodus of management recently. Whilst it is not a major red flag as companies keep losing key executives, the ED and the CFO who had left had promised a lot of growth fuelled by M&A and were incentivized to do it. The jury is out on how the new ED (from CMIG) and CFO will execute.

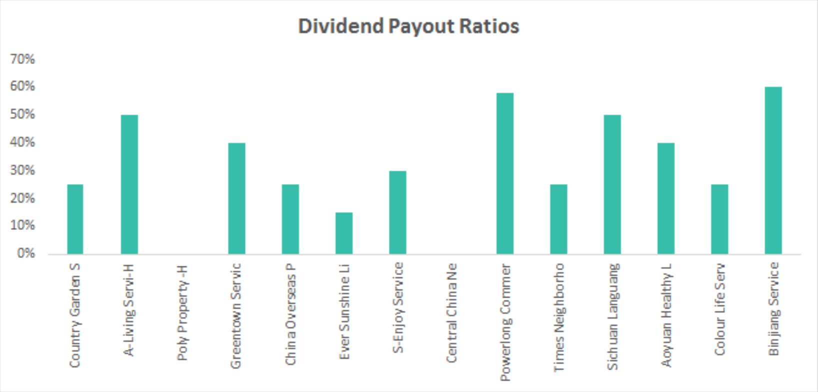
Operational Red Flags Not Specific to any company to look out for in the future:

- **M&A opportunities could be accompanied by lots of goodwill.** Company's like Languang Justbon Services (2606 HK), Times Neighborhood (9928 HK), Aoyuan Healthy Life Group Co (3662 HK) would be potential candidates to look out for on this. For the large caps, A-Living Services (3319 HK) would be a name where one would have to pay attention to the goodwill.
- **Excessive Receivable Writedowns.** As of now, this is not a major concern for any company specifically but it would be important to pay attention to this trend as well.

Dividends and Buybacks

PMC's are not high dividend-yielding stocks. They are fast-growing companies that will at some stage several years from now become high yield companies. The sector is very young which is why it is too early to determine who is shareholder-friendly.

Here is a look at the PMC's and their dividend payout ratios. The companies that stand out are Binjiang Service Group (3316 HK), Powerlong Commercial Management Holdings (9909 HK), Languang Justbon Services (2606 HK) and A-Living Services (3319 HK)



source: Company filings

Amongst the companies above, only Powerlong Commercial Management Holdings (9909 HK) and S-Enjoy Service Group Co Ltd (1755 HK) have done buybacks.

More Opportunities/New Deal Pipeline

We believe that investors should pay attention to the new deal pipeline, since there may be good opportunities beyond the names we have mentioned.

Here is a list of companies that have recently submitted application proofs to the HKex :

Date	Company
24-Jan-20	Sundy Service
24-Jan-20	Financial Street Property
23-Mar-20	Redsun Services
21-Apr-20	Shimao
8-May-20	Shi Shi Services
29-May-20	First Service
31-May-20	Excellence Commercial Property and Facilities Mgmt

source: Hkex

The Property Management sector is very exciting. Investors should be involved in this space and not miss out on the high growth opportunities it offers.

Disclosure & Certification

- I/We have position(s) in one or more of the securities referenced in this insight
- Views expressed in this insight accurately reflects my/our personal opinion(s) about the referenced securities and issuers and/or other subject matter as appropriate.
- This insight does not contain and is not based on any non-public, material information.
- To the best of my/our knowledge, the views expressed in this insight comply with Singapore law as well as applicable law in the country from which it is posted
- I/We have not been commissioned to write this insight or hold any specific opinion on the securities referenced therein
- I/We have signed the Insight Provider Agreement and this insight does not violate any of the terms specified therein.

— Sameer Taneja (07 Jun 2020)

Osbert Tang, CFA

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Areas of Expertise

- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: Hong Kong, China
- Sectors: Industrials, Utilities

Content Verticals

- Equity Bottom-Up, Thematic (Sector/ Industry)

Thematic (Sector/Industry)

China Environment Sector Deep Dive: Solid Waste Treatment

By Osbert Tang, CFA | 29 Jun 2020

EXECUTIVE SUMMARY

We are positive towards the outlook of China's solid waste treatment industry and believe the current share price level is a very good entry point, especially after the approval of the revisions in “Solid Waste Pollution Environmental Prevention and Treatment Law of the People's Republic of China” by National People's Congress in May which will become effective on 1 Sep. In addition to the Law which will lead to an improved operating landscape of the industry, the increase in waste volume stimulated by urbanisation and e-commerce, growth in waste treatment capability, potential for industry consolidation and favourable financial infrastructure are the factors that presented the industry with tremendous opportunities.

There are still risks including heightened competition due to fragmented industry structure, potential change in on-grid tariff and subsidies and weak power demand due to economic slowdown. However, the depressed valuations of the sector after sustained underperformance offer good value with long-term structural change in the industry, in our view. We rank the five major Hong Kong listed and A-share companies in the sector in the following order: Canvest Environmental Protection Group (1381 HK), China Conch Venture Holdings (586 HK), China Everbright Intl (257 HK), Zhejiang Weiming Environment (603568 CH), and China Everbright Greentech (1257 HK).

What's Original?

This Smartkarma Original takes a detailed look on the revised “Solid Waste Pollution Environmental Prevention and Treatment Law” and reads on the implications to the major listed waste treatment companies. In addition to discussions on the revenue and profit drivers of the individual companies, we will also assess the outlook for improvement in returns, and compared the relative valuations of individual companies within the sector based on their P/B vs. ROE and PEG ratios.

Since the waste treatment industry is highly fragmented, we analyse the possibility of consolidation as a potential way to improve sector return levels. Lastly, we will take this opportunity to introduce a leading A-share waste treatment company - Zhejiang Weiming Environment (603568 CH), which has recorded a marvelous share price performance - up 95% over the last three years and 28% YTD.

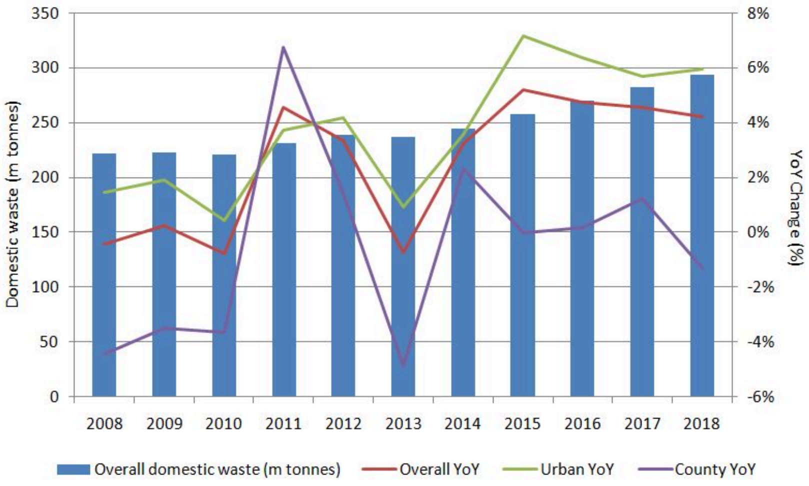
DETAIL

Background

This Smartkarma Original explores the investment thesis of China's waste treatment industry and look into the merits and challenges of the largest companies listed in the Hong Kong and Shanghai Stock Exchanges. Environmental protection has been a key priority of China and the importance of the China environment sector has grown over time. In particular, with the introduction of the revised "Solid Waste Pollution Environmental Prevention and Treatment Law of the People's Republic of China" (中华人民共和国固体废物污染环境防治法)" starting 1 Sep 2020, the operating environment faced by the waste treatment companies will turn more favourable. In our view, this should set the stage for reversal of the underperformance of the sector against the major China and Hong Kong equity market indices.

On the back of the continuous economic development, China has witnessed a strong growth in its waste volume over the last 10 years. The growth rate of domestic waste has seen acceleration in the last 5 years to a CAGR of 4.4% for 2013-2018, from just 1.3% for 2008-2013 (Figure 1). In particular, the growth for domestic waste in urban area has outpaced the growth in county area significantly by an average of more than 5pp in the last five years. The sharp growth rate can be partly explained by the rise in the popularity of e-commerce in the urban areas, and the rise in volume of waste has supported the rapid development of the waste treatment sector in China.

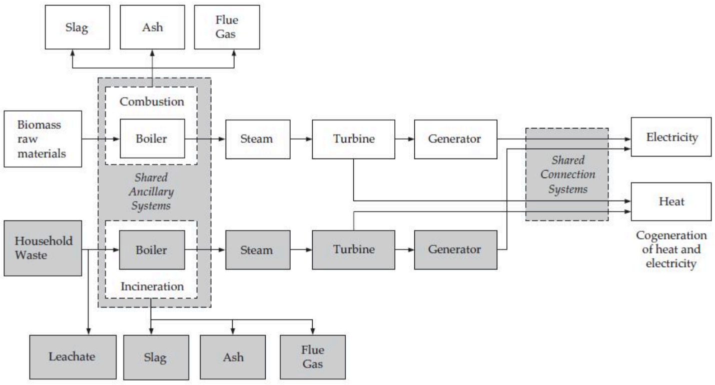
Figure 1: Domestic waste volume in China



Source: Ministry of Housing and Urban-Rural Development

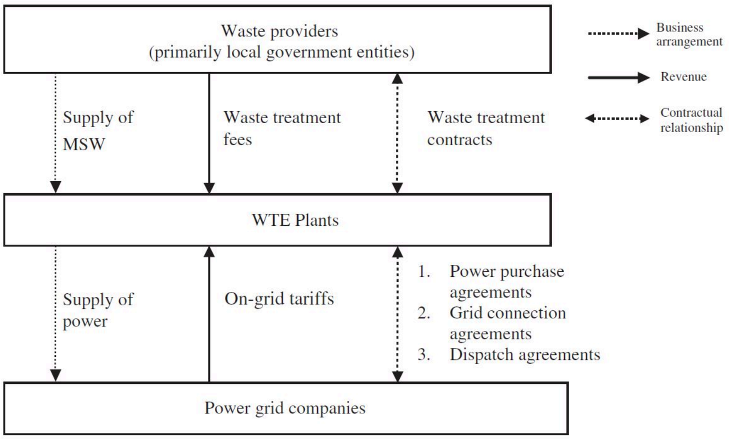
Treatment of the domestic waste in China is predominately by either landfill or incineration (Figure 2). Over the last ten years, incineration has been gaining popularity, partly driven by the risk of secondary pollution by landfill and the advantage of waste-to-energy (WTE) of incineration. The typical WTE business model involved the WTE enterprises receiving waste treatment fees from the waste providers, mostly local government entities, and power tariffs from the power buyers, mostly power grid companies (Figure 3).

Figure 2: Typical biomass and waste incineration WTE process


Slag
Ash
Flue Gas
Combustion
Biomass raw materials
Boiler
Steam
Turbine
Generator
Shared Connection Systems
Electricity
Shared Ancillary Systems
Heat
Household Waste
Boiler
Steam
Turbine
Generator
Cogeneration of heat and electricity
Incineration
Leachate
Slag
Ash
Flue Gas

Source: China Everbright Greentech IPO

Figure 3: Typical Waste-to-Energy business model


Waste providers
(primarily local government entities)
Supply of MSW
Waste treatment fees
Waste treatment contracts
WTE Plants
Supply of power
On-grid tariffs
1. Power purchase agreements
2. Grid connection agreements
3. Dispatch agreements
Power grid companies
Business arrangement
Revenue
Contractual relationship

Note: MSW = municipal solid waste. Source: Canvest IPO

Solid Waste Pollution Environmental Prevention and Treatment Law

The "Solid Waste Pollution Environmental Prevention and Treatment Law of the People's Republic of China" (中华人民共和国固体废物污染环境防治法)" (Solid Waste Pollution Law) is the main Chinese law governing the prevention and treatment of solid waste pollution in China. The first set of Solid Waste Pollution Law, effective 1 Apr 1996, was promulgated by the then President of the People's Republic of China Jiang Zemin on 30 Oct 1995 after approval in the 16th session of the Standing Committee of the 8th National People's Congress (NPC). Subsequently, the Law has undergone five revisions in 2004, 2103, 2015, 2019 and 2020, with the latest one being the version approved in the 17th session of the Standing Committee of the 13th NPC on 26 Apr 2020 which will become effective on 1 Sep 2020.

The revisions made in this year can be considered as the most significant and extensive ones when compared with the previous revisions (Figure 4). A total of 35 clauses have been added to the original 91-clause Law. The key overall principles are to clearly classify the responsibilities of various government and enterprise segments in the production and treatment of waste and to explicitly spell out of the penalty on violation of the Law.

Figure 4: Key items in the latest version of Solid Waste Pollution Law

Areas	Key items/changes
Overall principles	1. The prevention and control of environmental pollution caused by solid waste shall adhere to the reduction, recycling and harmlessness principles.
	2. Units and individuals that produce, collect, store, transport, utilise and dispose of solid waste shall be responsible for the environmental pollution caused by the solid waste.
	3. It is the local governments' responsibilities for the prevention and control of environmental pollution caused by solid waste. The degree of completion of the waste control target will be incorporated into the assessment and evaluation of the local governments.
Supervision and management	1. The local governments should incorporate the prevention and control of environmental pollution caused by solid waste into the national economic and social development, and ecological environment protection plans, and take effective measures to reduce the amount of solid waste generated, promote the comprehensive utilisation of solid waste, reduce the harm of solid waste, and minimise the amount of solid waste landfill.
	2. The ecological ministry under the State Council should, together with the other departments, establish a national information platform for the prevention and control of environmental pollution caused by solid waste, and promote the monitoring and tracing of the processes of solid waste collection, transfer and disposal.
	3. The State should gradually realise zero import of solid waste.
Industrial solid waste	1. The unit that produces industrial solid waste should establish a management register of industrial solid waste, recording the type, quantity, flow direction, storage, utilisation, disposal and other information of industrial solid waste.
	2. A unit that produces and entrusts others to transport, utilise or dispose of the industrial solid waste should verify the qualification and technical ability of the entrusted party and sign a written contract. The unit will also bear joint and several liabilities with the entrusted party that causes environmental pollution and ecological damage.
	3. Units that produce industrial solid waste should obtain permits for discharge of pollutants which the specific measures and implementation procedures are formulated by the State Council.
Domestic waste	1. Local governments should speed up the establishment of a management system for classification and sorting of domestic waste for delivery, collection, transportation and treatment, so as to achieve effective domestic waste classification and sorting.
	2. The units, families and individuals that produce domestic waste should have the obligations of reducing the amount of domestic waste and handling them according to their classifications. Such domestic waste should be collected, transported and disposed of appropriately based on their classifications.
	3. Agricultural trade and wholesale markets should strengthen the management of environmental hygiene, maintain a clean environment, and clean, classify, collect, and dispose of properly the produced waste.
	4. Domestic waste treatment units should monitor the real-time pollutant discharge situation and display such real-time data publicly. The local ecological environment department should monitor the situation by establishing connections to the monitoring equipment.
	5. Units that produce and collect kitchen waste should hand over such waste to units with the corresponding qualifications for harmless treatment.
	6. Local governments should establish a pricing system for domestic waste treatment, based on the principle that the responsibility of such charges should be bear by the waste producers.
	7. Local governments should formulate pricing standard for domestic waste treatment that reflect differential pricing according to waste classification and quantity and should seek sufficient opinions from the public in accordance with the local conditions. The pricing standard should be publicly announced.
Construction waste and agricultural solid waste	1. The environmental hygiene departments of the local governments are responsible for the prevention and control of environmental pollution from construction waste, establishment of a construction waste management system, standardisation of the generation, collection, storage, transportation, utilisation and disposal of construction waste, strengthening of the construction of facilities for construction waste disposal and ensuring the safety disposal and prevention of environmental pollution.
	2. The agricultural and rural departments of the local governments are responsible for guiding the construction of the recycling system of agricultural solid waste, encouraging and guiding relevant units and other entities on the collection, storage, transportation, usage and disposal of agricultural solid waste, strengthening supervision and management, and preventing environmental pollution.

	3. Producers of electrical and electronic products, lead-acid batteries, automotive power batteries should establish, either by self construction or commission other parties, a public waste recycling system that matches the sales volume so as to achieve effective recycling.
	4. Business operators shall abide by the compulsory standards restricting overpackaging. The market supervision and administration departments of the local governments should strengthen the oversight of overpackaging.
	5. The relevant local government departments should incorporate sludge treatment facilities into the planning of and promote the simultaneous construction of urban drainage and sewage treatment. Sewage treatment charges and compensation scope should cover the cost of sludge treatment and the normal operation of sewage treatment facilities.
Hazardous waste	1. Units that produce hazardous waste should formulate plans for the waste management, establish a register, record relevant information truthfully, and report the types, production, flow, storage and disposal of such wastes to the relevant local ecological environment department through the national hazardous waste information system.
	2. The relevant health, hygiene and ecological environment departments of the local governments should strengthen the supervision and management of the collection, storage, transportation and disposal of medical wastes, so as to prevent them from endangering public health and polluting the environment.
	3. Medical and health institutions should collect the medical wastes generated in categories according to law and hand them over to the centralised medical waste disposal units for disposal. The centralised disposal units of medical waste should collect, transport and dispose of medical wastes in a timely manner.
Supportive measures	1. All levels of governments should strengthen the prevention and control of environmental pollution caused by solid waste and arrange necessary funds for: a.) scientific research and technological development of prevention and control of environmental pollution caused by solid waste; b.) classification and sorting of domestic waste; c.) construction of centralised solid waste disposal facilities; d.) emergency disposal of medical and other hazardous wastes generated during major epidemics and other emergencies; and e.) other matters related to prevention and control of environmental pollution caused by solid waste.
	2. The State encourages and supports the participation of social entities in the prevention and control of environmental pollution caused by solid waste, and provides relevant policy supports.
	3. Entities engaged in the prevention and control of environmental pollution caused by solid waste, such as comprehensive utilisation of solid waste, should enjoy preferential tax treatment in accordance with the provisions of laws and administrative regulations.
Legal responsibilities	1. If the responsible department or official violates the provisions of the Law, the local governments should order to make corrections, and the person in charge and other persons directly responsible should receive punishment according to the Law.
	2. Significantly increase the cash penalty across various violations of the Law, and for serious cases, suspension or closure of operations of the party violating the Law.

Source: http://www.gov.cn/xinwen/2020-04/30/content_5507561.htm

Overall, the major changes and key spirits under the revised Law can be summarised into the following key points:

1. affirm the government's plans to reduce solid waste production, enforce the harmless treatment of such waste and stop the import of solid waste;
2. define the responsibilities of the local governments in solid waste management and treatment, and clearly establish that solid waste control performance will be a part of the assessment and evaluation of local governments;
3. set out the specific responsibilities of the private sector in the production, handling and treatment of solid wastes;
4. enforce the strict implementation of waste classification and sorting system and carry out differential treatment based on the different categories of waste;

5. set up a pricing system for handling of solid waste on the basis that the producers of the waste should be held responsible for the treatment fees;
6. lay out the support provided by the central and local governments on solid waste management and treatment initiatives; and
7. introduce more severe penalties and punishments for violation of the Law.

Opportunities

1. Solid Waste Pollution Law to reshuffle the operating landscape

Upon the implementation of the revised Solid Waste Pollution Law, we believe there will be meaningful change in the operating landscape of China's waste treatment industry. The latest version of the Law essentially means that local governments will play a more active role in the control and treatment of solid waste as now they are clearly hold responsible for achieving the waste pollution control target. The substantial increase in penalty for violation and illegal treatment or disposal of industrial and hazardous waste also mean that enterprises will be more willing to pay higher charges for appropriate treatment provided by qualified service providers.

On the back of the Law, we expect the local government to roll out more detailed policies and measures related to solid waste treatment in the next twelve months. This will likely to include a system with a stricter monitoring of hazardous waste disposal and penalties for illegal treatment of solid waste. In addition, this will set a stage for the revamp of existing waste collection and treatment fee arrangements to allow for better reduction and treatment of domestic waste. In our view, the Law's support of the establishment of more commercial-oriented pricing arrangements is positive to the sector as such pricing system will be able to raise returns for the waste treatment companies (Figure 5).

Figure 5: Impact of the Solid Waste Pollution Law

Clause in the Law	Impact
It is the local governments' responsibilities for the prevention and control of environmental pollution caused by solid waste. The degree of completion of the waste control target will be incorporated into the assessment and evaluation of the local governments.	Clearly defined the responsibilities of the local governments in prevention and control of environment pollution and in waste treatment. Local governments will become more proactive in policy introduction and monitoring of the execution of such policies.
The ecological ministry under the State Council shall, together with the other departments, establish a national information platform for the prevention and control of environmental pollution caused by solid wastes, and promote the monitoring and tracing of the process of solid waste collection, transfer and disposal.	There will be increasingly tight monitoring of environmental pollution caused by solid wastes. Producers of such wastes will be more willing to pay higher fees to qualified waste treatment operators to avoid any penalty.

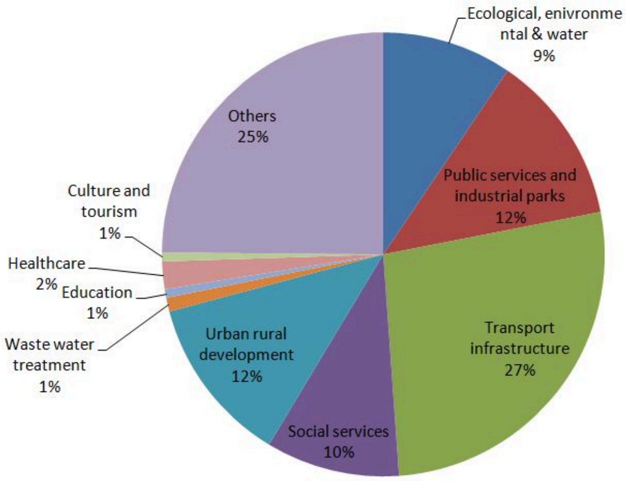
A unit that produces and entrusts others to transport, utilise or dispose of the industrial solid waste should verify the qualification and technical ability of the entrusted party and sign a written contract. The unit will also bear joint and several liabilities with the entrusted party that causes environmental pollution and ecological damage.	More stringent cross-checking of the qualifications of the waste treatment enterprises. As a result, stronger, larger, more experienced waste treatment will benefit as pricing for waste treatment is now not the only major concern of the waste producers.
Domestic waste treatment units should monitor the red-time pollutant discharge situation and display such real-time data publicly. The local ecological environment department should monitor the situation by connecting to the monitoring equipment.	More technologically capable and larger waste treatment companies will be more qualified to fit this requirement. Small companies with limited financial strengths will become less competitive due to the added capex in relation to the overall real-time monitoring system.
Local governments should establish a pricing system for domestic waste treatment, based on the principle that such payments should be bear by the waste producers. Local governments should formulate pricing standard for domestic waste treatment that reflect differential pricing according to waste classification and quantity and should seek sufficient opinions from the public in accordance with the local conditions. The pricing standard should be publicly announced.	More local governments will roll out new pricing standard for waste treatment over the next twelve months. There is upside on the pricing as this will tie to the volume of waste produced - the more waste one produced, the higher charges to be paid.
Governments at all levels should strengthen the prevention and control of environmental pollution caused by solid waste and arrange necessary funds.	More financial support from the government will improve the operating landscape of the industry. Improved governmental waste treatment infrastructure will potentially life the efficiency of the waste treatment operators.
The State encourages and supports the participation of social entities in the prevention and control of environmental pollution caused by solid waste, and provides relevant policy supports.	The policy may encourage more private enterprises to enter into the waste treatment industry, particularly the ones with strong financial capability. There will also be more privatisation of government waste treatment assets.
Entities engaged in the prevention and control of environmental pollution caused by solid waste, such as comprehensive utilisation of solid waste, shall enjoy preferential tax treatment in accordance with the provisions of laws and administrative regulations.	This policy measure may potentially increase the return and profitability of the waste treatment companies, which should be taken as positive to the industry.
Significantly increase the cash penalty across various violations of the Law, and for serious cases, suspension or closure of operations.	Increase the cost of violation will raise the incentive for conformity to the Law. As a result, there will be more business opportunities presented to the waste treatment companies.

Source: http://www.gov.cn/xinwen/2020-04/30/content_5507561.htm, Osbert Tang

Waste collection and treatment is often a form of social services offered and expenses are paid by the local governments from their budget. Given the limitation of government budgets, the return for waste treatment business is generally low. Despite so, we have already seen that many local governments have stepped up their environmental protection and waste treatment investments.

Historically, local governments issued special purpose bonds to raise funds for specific projects. In the first five months of this year, various local governments have issued an aggregate of Rmb2.2trn of new special purpose bonds. Out of such total, around Rmb200bn are for investment in ecological, environmental and water projects. Although this only accounted for 9% of the total funds raised, it is already the fifth largest one in terms of use of proceeds from special purpose bonds (Figure 6).

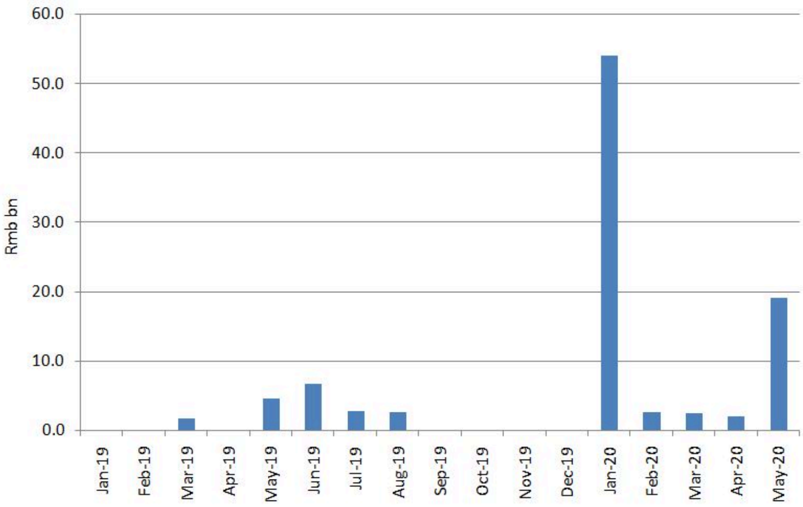
Figure 6: Breakdown of use of special purpose bond proceeds



Source: Eastmoney Choice

If we look at the amount of special purpose bonds used just for environmental protection projects, we will realise a phenomenal growth in 5M20. Such bond issuance amounted to Rmb80.6bn in the period, a stellar 11.3x increase when compared with 5M19 (Figure 7). The huge spending increase reflects the government's heightened focus on environmental protection and preservation. Although no further breakdown is available on the amount being spent purely on waste management and treatment, we believe its growth pace has also accelerated given the government's increase in concerns on solid waste pollution.

Figure 7: Monthly new special purpose bonds issued for environmental uses



Source: Eastmoney Choice

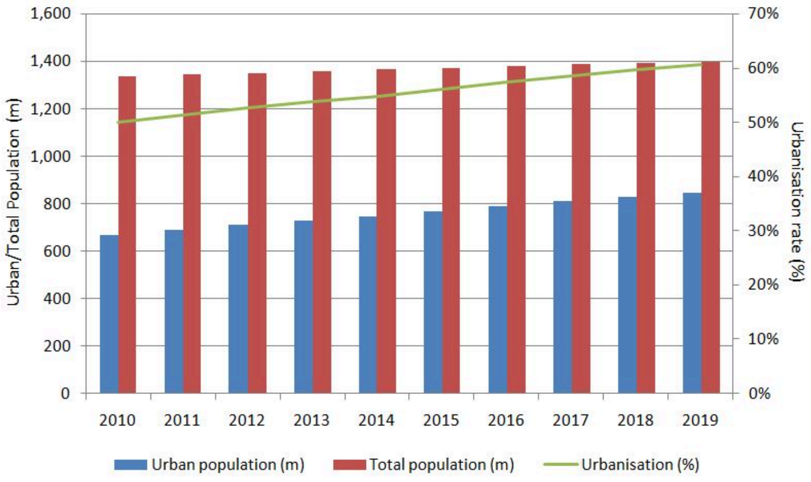
The elevation of investments by the local governments should reflect future improvement in the waste management infrastructure and facilities. This will promote the effective collection and sorting of domestic waste and provide a stage to better facilitate the waste treatment companies' operations. Also, in accordance with the Law, local governments are required to arrange necessary funds for the: a.) scientific research and technological development of prevention and control of environmental pollution caused by solid waste; b.) classification and sorting of domestic waste; c.) construction of centralised solid waste disposal facilities; d.) emergency disposal of medical and other hazardous wastes generated during major epidemics and other emergencies; and e.) other matters related to prevention and control of environmental pollution caused by solid waste. We think there will be more special purpose bonds issued by the local governments to support the development of the industry.

The revised Law specifically states that waste producers are responsible for the waste treatment charges; and we believe this implies upside to the pricing for waste treatment and profitability of the companies. The central government's policy supports as stipulated in the Law, including preferential tax treatment and encouragement of financial institutions to extend credits to solid waste treatment projects, will further optimise the operating landscape of the waste treatment industry. In our view, these are all positive aspects that will drive improvement in performance of the sector going forward.

2. Increase in urbanisation and e-commerce

One major factor contributing to China's sharp increase in solid waste is the country's ongoing urbanisation. In 2019, there are a total of 848m people living in China's urban areas, translating into an urbanisation rate of 60.6% (Figure 8). This is up from just 49.9% ten years ago, with urban population leapt by 179m. This is a massive growth, and has led to the escalation of the solid waste volume in just a short period of time.

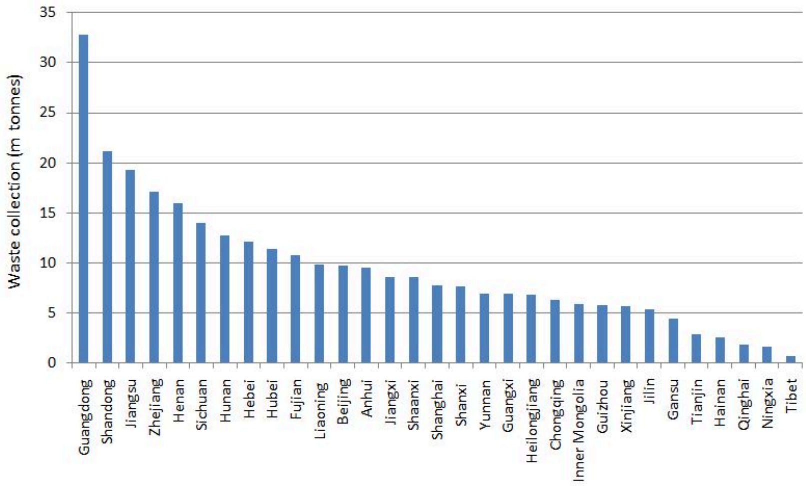
Figure 8: China's urbanisation rate



Source: National Bureau of Statistics

When we further look at the geographical breakdown of solid waste volume, we can easily see that the top five waste producing provinces are all the most economically developed ones with high urbanisation rates. These provinces are Guangdong, Shandong, Jiangsu, Zhejiang and Henan, and on aggregate, they accounted for 36% of China's total solid waste volume in 2018 (Figure 9).

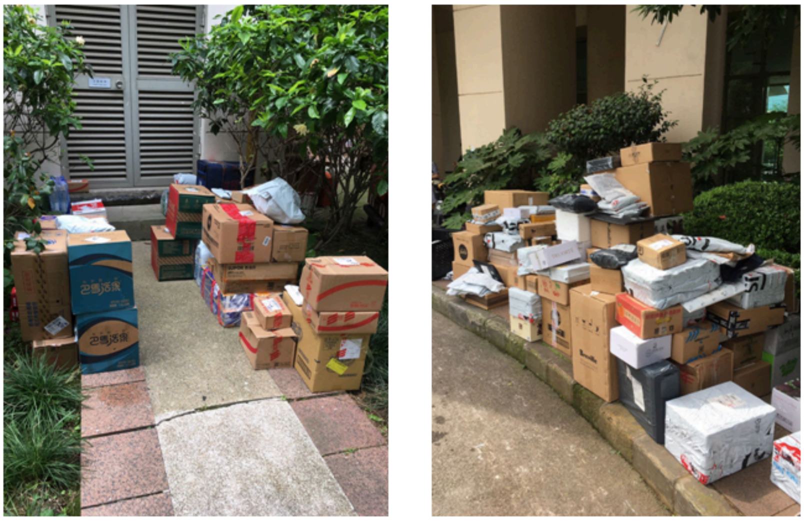
Figure 9: Waste volume by province



Source: Ministry of Housing and Urban-Rural Development

In recent years, driven by the increase in the penetration of e-commerce, the express delivery industry has recorded an astronomical growth. It will not be surprised that we see stacks of corrugated boxes laid outside the entrance of every residential complex every morning waiting for delivered to the households inside the residential blocks (Figure 10). These express packages have created massive volume of wastes which are difficult to imagine before e-commerce was introduced in China.

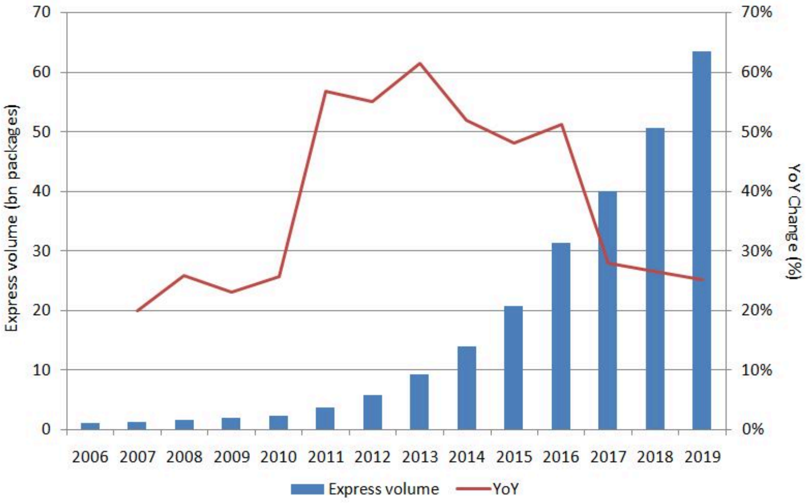
Figure 10: Stacks of express packages outside of a residential complex in Shanghai



Source: Osbert Tang

In 2019, the total number of express packages in China has reached 63.5bn, representing a CAGR of 35.4% from 14bn in 2014 (Figure 11). Moreover, it is still growing at an annual rate of over 25% in the last three years. In fact, as a proportion of total express delivery packages, contribution from e-commerce has increased from 28% in 2007 to 78% in 2018. In other words, only around 20% of China's total express packages nowadays are not derived from e-commerce. The huge amount of e-commerce express package materials has contributed to the significant growth in China's solid waste volume, particularly paper and plastic wastes.

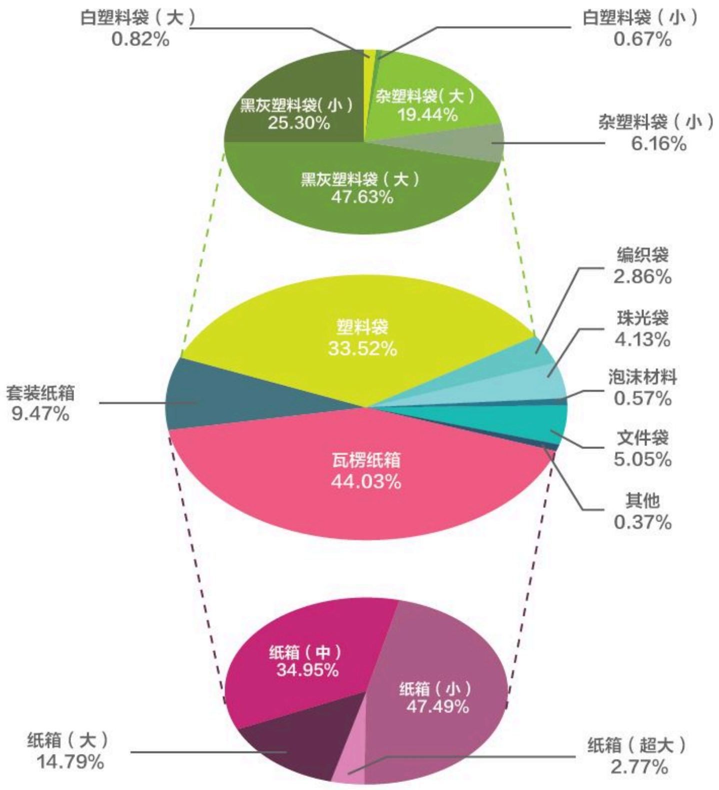
Figure 11: Growth in express delivery volume in China



Source: National Bureau of Statistics

According to a Green Peace report on express package waste in China, total express package materials have reached 9.4m tonnes in 2018, and if the current trend stays on, it will reach 41.3m tonnes by 2015, putting heavy pressure on China's waste treatment capacity. Corrugated boxes and plastic materials are the two major waste materials in express delivery, accounting for 44.0% and 33.5% of the total express delivery waste in China. The other solid waste include cartons, woven bags, pearlescent bags, foam materials and other packaging materials, which on aggregate accounted for the remaining 22.5% (Figure 12).

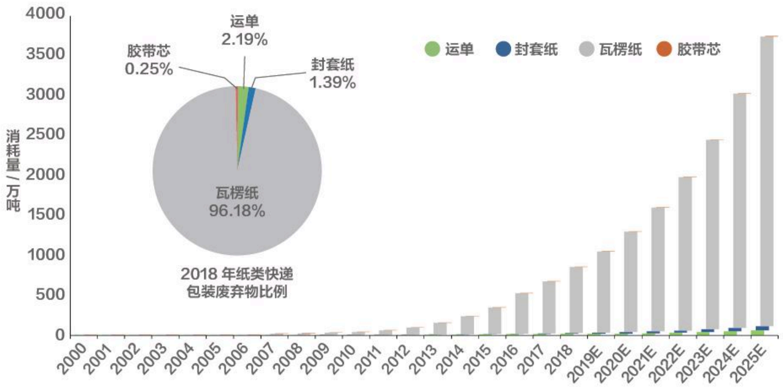
Figure 12: Breakdown in express delivery waste



Source: Green Peace

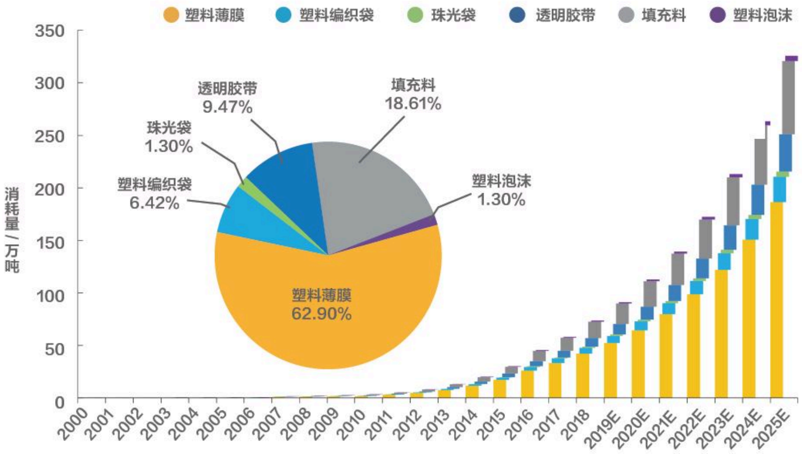
In 2018, paper materials waste amounted to 8.6m tonnes, accounted for 91% of the total express package materials and corrugated boxes represented the bulk of all (Figure 13). Although plastic materials only accounted for 9% of the total express package materials (Figure 14), most of them are made using recycled waste from unidentified sources which pose hazard to the environment and human body. As such, there is an ever-increasing need for treatment of these wastes derived from express delivery in China's urban areas.

Figure 13: Paper waste growth from express delivery



Source: Green Peace

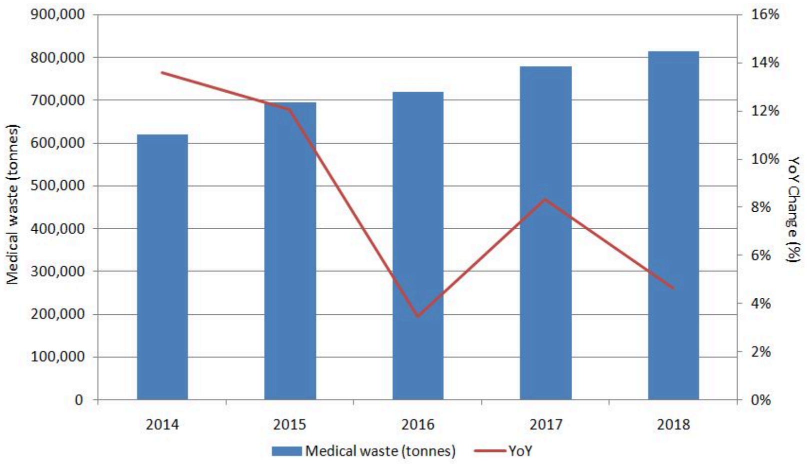
Figure 14: Plastic waste growth from express delivery



Source: Green Peace

Separately, the outbreak of COVID-19 in this year which resulted in a global pandemic has further raised the importance for treatment of medical wastes. During the period of 2013-2018, China's total volume of medical waste has grown by 49%, and in 2018, there are 817,000 tonnes of medical waste produced (Figure 15).

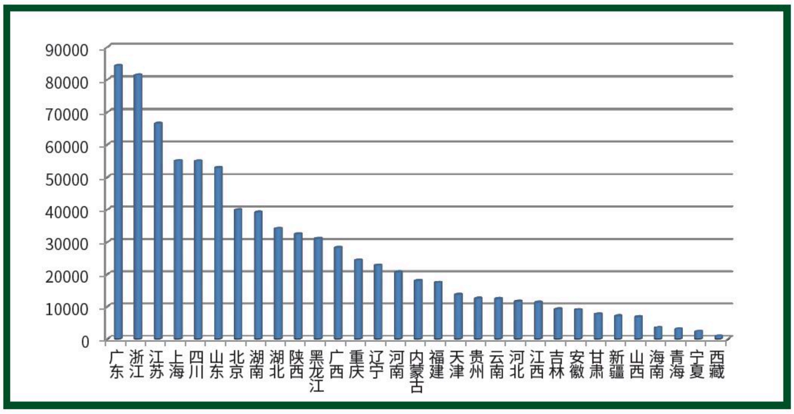
Figure 15: Growth in China's medical waste volume



Source: Ministry of Ecology and Environment

Again, the most affluent areas which have better medical resources accounted for most of the medical waste. The top five medical waste producing provinces/municipalities in 2018 are Guangdong, Zhejiang, Jiangsu, Shanghai and Sichuan (Figure 16). Fortunately, almost all such medical wastes have been treated properly. However, with the COVID-19 outbreak, the governments have stepped up efforts to improve the treatment of such medical waste.

Figure 16: Medical waste production by province/municipality (in tonnes)



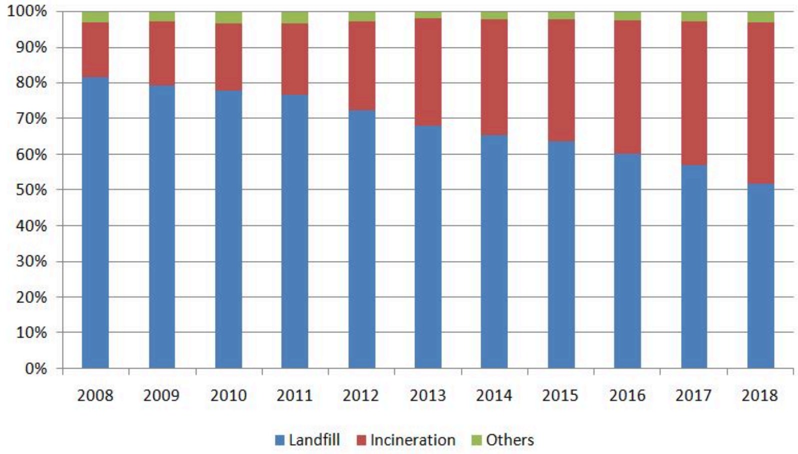
Source: Ministry of Ecology and Environment

In the Law, the relevant health, hygiene and ecological environment departments of the local governments are required to strengthen the supervision and management of the collection, storage, transportation and disposal of medical wastes, so as to prevent from endangering public health and polluting the environment. We believe the treatment of medical waste represents an important potential market opportunity for the waste treatment companies. However, given the technical and quality requirements for such treatments, only companies with better qualifications and technologies will be competitive enough in this market segment.

3. Increase in solid waste treatment capability

Over the last ten years, there is a significant change in the breakdown of the modes of treatment of urban solid waste in China. Back in 2008, landfill is the predominant treatment mode which accounted for 82% of total waste. In 2018, though the total volume treated by landfill is still the highest among all modes at 117m tonnes, the proportion has declined to just 52%. In the meantime, the share of incineration has surged from just 15% in 2008 to 45% in 2018, which is a two-fold increase in 10 years (Figure 17). Moreover, the absolute volume of incineration has leapt by 5.5x to 102m tonnes in 2018. The decline in landfill is primarily driven by the lack of landfill sites, safety and secondary pollution issues (for example, landfill waste may emit methane). Meanwhile, incineration is now a more feasible mode given the improvement in technology and its ability to generate power and heat. We believe it is highly likely that incineration will overtake landfill as the primary solid waste treatment method in the next two years to account for over 50% of the total solid waste treatment volume.

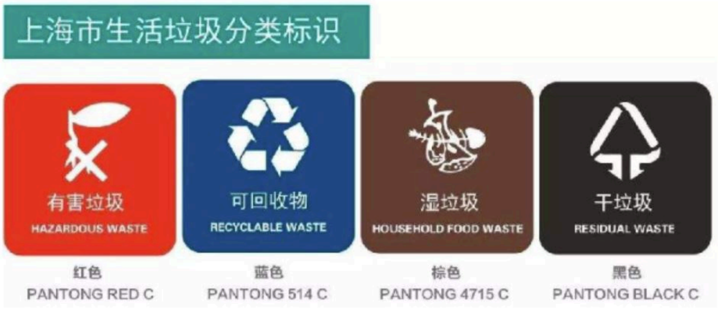
Figure 17: Breakdown of urban solid waste treatment



Source: Ministry of Housing and Urban-Rural Development

Another driver for incineration is the adoption of domestic waste classification by China in Sep 2019, based on the "Reference standard for daily garbage classification by public institutions" (公共机构生活垃圾分类工作评价参考标准) published by the National Government Offices Administration. On the basis of this standard, various local governments have implemented their own classification systems, with most of them adopted the four-type system. Although there are different nomenclatures in different areas, wastes are generally classified as: 1.) household food waste; 2.) recyclable waste; 3.) hazardous waste; and 4.) residual waste (Figure 18). The implementation of comprehensive system for waste classification increased the ease of waste treatment companies in differential handling of different types of waste, making incineration an even more optimal choice of waste treatment.

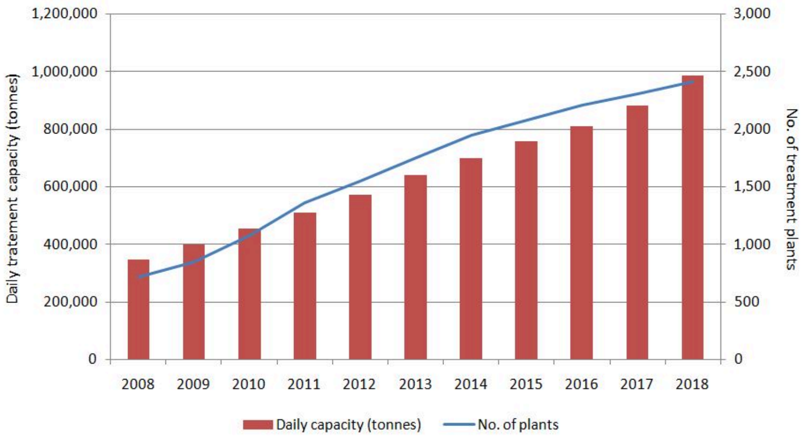
Figure 18: The four-type waste classification system in Shanghai


上海市生活垃圾分类标识
有害垃圾
HAZARDOUS WASTE
红色
PANTONG RED C
可回收物
RECYCLABLE WASTE
蓝色
PANTONG 514 C
湿垃圾
HOUSEHOLD FOOD WASTE
棕色
PANTONG 4715 C
干垃圾
RESIDUAL WASTE
黑色
PANTONG BLACK C

Source: www.baidu.com

Along with the increase in solid waste production, China's daily waste treatment capacity has also expanded sharply over the last 10 years with a growth of 182%. In 2018, the daily capacity of solid waste treatment has reached 986,891 tonnes (Figure 19). By end of 2022, the daily capacity will reach 1.11m tonnes, representing a 4% CAGR in the three-year period.

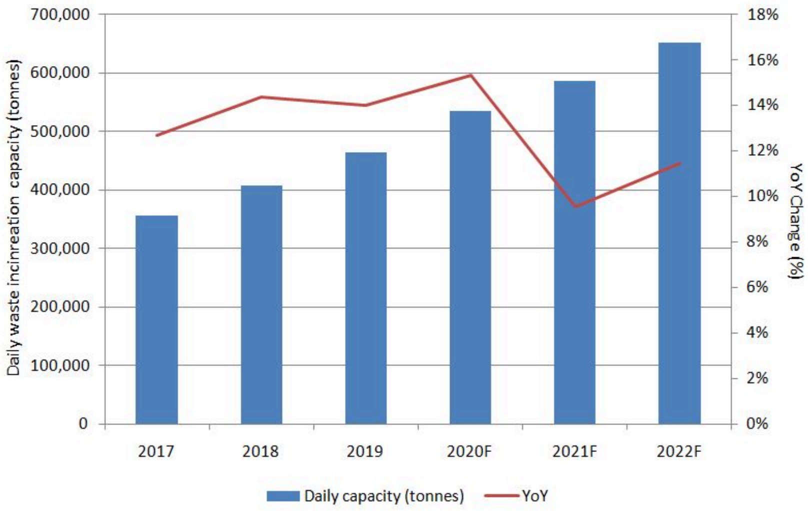
Figure 19: Waste treatment capacity by year



Source: Ministry of Housing and Urban-Rural Development

The growth in waste treatment capacity is primariy driven by the strong supply of waste incineration capacity. Major listed companies have significant outstanding projects currently under construction and set to be completed over the next three years. Total waste incineration capacity will increase to 653,000 tonnes/day in 2022, up by a CAGR of 12% from the level in 2019 (Figure 20). Such capacity pipeline will be positive for the waste treatment companies to capture the overall business volume driven by both the organic increase in solid waste and the continued shift from landfill to incineration.

Figure 20: Waste incineration capacity

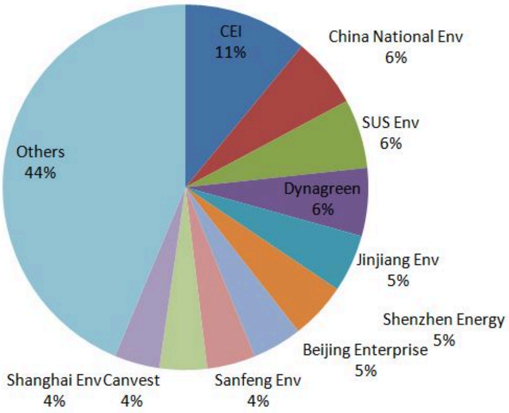


Source: 13th Five-year Plan of national urban domestic waste harmless treatment facilities

4. **Potential for industry consolidation**

The waste treatment industry in China is a very fragmented one. With most of the listed companies involved in incineration, or mostly WTE, this is the area where competition is the most intense. Based on the 2019 capacity, we believe the largest player in the market is China Everbright Intl (257 HK) (CEI). However, even though it is the industry leader, it only has a market share of 11%. The remaining names in the top ten list only have between 4% and 6% in their share, meaning that on aggregate, the 10 largest operators in the industry has a total market share of 56% (Figure 21). The fragmented competitive landscape is primarily a result of the localised operations that need extensive collaboration with the local governments and also that previously many local government awarding single project to the operators, instead of using a packaged approach.

Figure 21: Market share distribution in waste incineration industry, based on capacity



Source: Wind

Many waste treatment companies are small listed companies in the A-share market. Their low returns suggest that profitability and operating efficiency are weak. The low return earned suggested there are potential for increased industry consolidation to boost operating efficiency and asset utilisation. Over the last two years, there have been many M&A transactions in the sector, and we expect this trend will continue to escalate on the back of the drive to improve return.

We see possibility that more local governments to sell their own waste treatment operations to third-party operators. These projects are mostly with stable revenue streams but due to their governmental status, they are historically operating at low profitability levels. Given the better management capability and operating philosophy, the listed companies will be able extract more value from these projects than the government departments. We see these as attractive opportunities for the non-government operators to add value and improve the project returns to boost their own profitability.

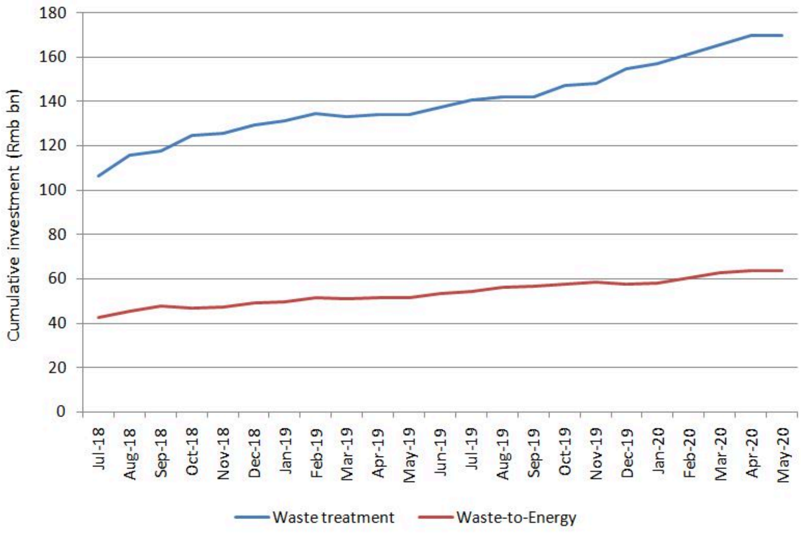
5. Favourable financial infrastructure

Public-private partnership (PPP) has been an increasingly popular arrangement for infrastructure projects in China. Specifically, PPP is a cooperative arrangement between two or more public and private sectors to design, build, finance, operate and/or maintain an infrastructure project typically for a long-term horizon. In order to alleviate the financial pressure on the local governments, China has been actively promoting PPP over the last five years. Many of the waste management and treatment projects in China over the last few years have employed the PPP structure.

According to the China Public Private Partnerships Center of the Ministry of Finance, there are 544 and 133 waste treatment and WTE PPP projects, respectively, at the end of May 2020. Cumulative investment of these two project types has reached Rmb170bn and Rmb64bn, respectively (Figure 22).

The growth rates are also impressive, reaching 81% and 56%, respectively, in the last two years. The central government is very supportive to the PPP model, and this will stay as an important driver for the waste treatment industry in China. The National Development and Reform Commission (NDRC) has issued "Notice for promoting the securitisation of infrastructure PPP projects" in Dec 2016. And in the government's promotion of REIT program, the requirements for PPP projects to issue REITs are also specifically laid out. For example, the procurement arrangement of the PPP projects for issuing REIT is restricted to only demand risk model, with the availability payment and hybrid models being excluded from the REIT program.

Figure 22: Cumulative investment in PPP waste treatment/WTE projects



Source: Wind

Another facilitating financial infrastructure for the sector is the government's REIT program. On 30 Apr 2020, the China Securities Regulatory Commission (CSRC) and NDRC jointly announced the commencement of pilot program in public infrastructure REITs and published the Opinion Seeking Draft <公开募集基础设施证券投资基金指引(试行)(征求意见稿)>, promoting the issuance of REIT by infrastructure companies. In particular, the CSRC and NDRC have priority support for the companies and projects at the Beijing-Tianjin-Hebei Integration, Yangtze River Economic Zone, Xiongan New Area, Guangdong-Hong Kong-Macao Greater Bay Area, Hainan Island and Yangtze River Delta. In terms of industries, the solid and hazardous waste treatment industry, along with warehouses and logistics, toll roads, public utilities (water, power, gas and heat) and urban sewage and waste treatment, are listed as the priority support industries.

In our view, the introduction of REIT program will provide a financing alternative for the waste treatment companies to pursue new project investments. In particular, the REIT program can allow companies to recycle their projects. The realised cash inflow from the REIT listings can be deployed either to reduce their debt level or fund investment in new projects. Also, a REIT issuance will improve the ease for the market to price the underlying assets by discounting the future cashflow stream which is of higher transparency and predictability. This is achieved through the fact that REITs must distribute at least 90% of their distributable profit to shareholders annually in the form of cash dividends. We believe this will reduce the discount to book value and NAV that many waste treatment stocks are currently trading on.

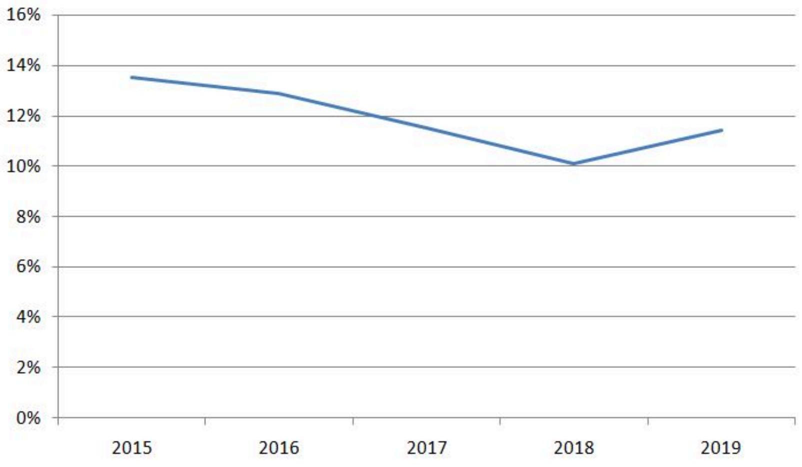
Risks

1. Heightened competition in a fragmented industry

As we discussed earlier, the waste treatment industry is very fragmented in China. In the area of WTE, the top five players have a aggregate market share of 34%, roughly 6-7% each. In fact, only CEI has a share of over 10%, and is already the largest in the industry. Although this structure of the market will provide room for M&As, a fragmented market will also suggest heightened competitions, particularly for the smaller players.

It is partly due to intense competition that many companies, especially the one listed in the A-share market, are having low-single digits of ROEs. In 2019, the average ROE of the A-share companies in the sector is just 4.9%, compared with an average of 17.9% for the Hong Kong-listed counterparts, with an overall average of 11.4% (Figure 23). The Hong Kong-listed companies are the larger players in the market relative to their A-share peers. With many of the A-share of companies only operating in a single geographical region, they are unable to realise any economies of scale and the cost synergy when compared with the larger players which have a more national coverage.

Figure 23: Historical average sector ROE



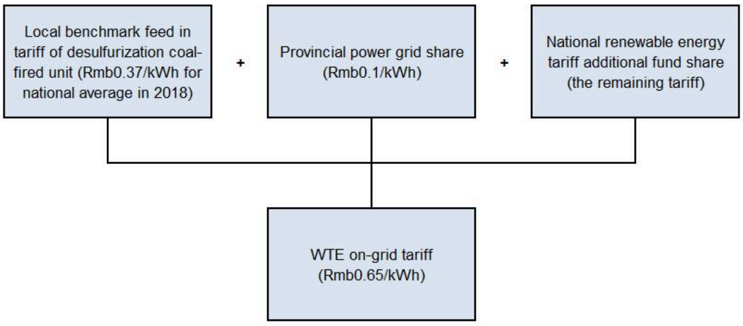
Source: Wind

2. Change in on-grid tariff and subsidies

In 2012, the NDRC announced the "Notice in relation to the Optimisation of WTE Power Tariff Policy (國家發展改革委關於完善垃圾焚燒發電價格政策的通知) (WTE Power Price Policy Notice). This Notice has set out the details of the determination of WTE on-grid tariffs that are followed until now. According to this Notice, the calculation of the on-grid tariffs will take reference to the amount of on-grid electricity generated based on the amount of municipal solid waste processed. The on-grid tariffs for the first 280kWh of power generated by every tonne of waste is Rmb0.65/kWh, and any additional power output will be charged at the same rate as that for coal power projects in neighbouring areas.

In fact, there are three components to the Rmb0.65/kWh on-grid tariffs: 1.) the local benchmark feed in tariff of desulfurization coal-fired unit (Rmb0.37/kWh for national average in 2018); 2.) provincial power grid share of tariff (Rmb0.1/kWh); and 3.) national renewable energy tariff additional fund share (the remaining portion) (Figure 24). The last two can be considered as the subsidies provided by the governments to WTE and renewable energy (which WTE is one of them), respectively.

Figure 24: Composition of the WTE power on-grid tariff


Local benchmark feed in tariff of desulfurization coal-fired unit (Rmb0.37/kWh for national average in 2018)
+
Provincial power grid share (Rmb0.1/kWh)
+
National renewable energy tariff additional fund share (the remaining tariff)
WTE on-grid tariff (Rmb0.65/kWh)

Source: NDRC, Osbert Tang

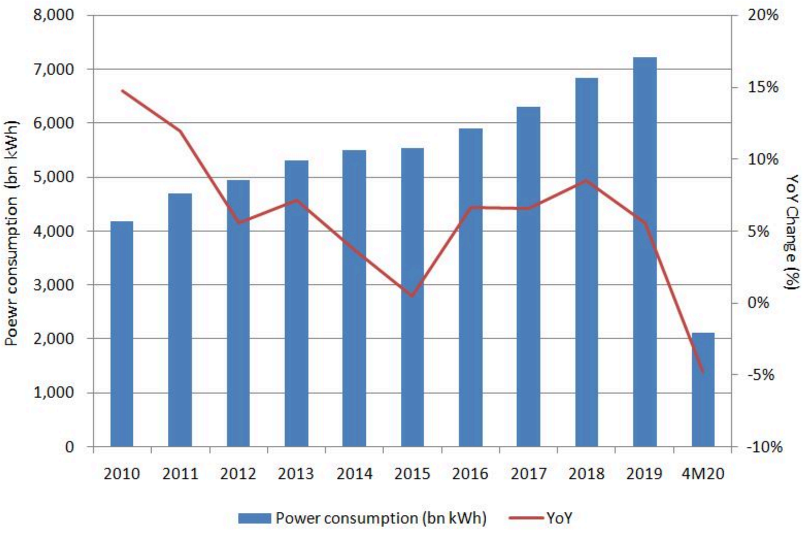
Due to the government's inclination to gradually move the power market to a market-driven structure, there are increasing voices supporting the removal of subsidies provided for renewable energy. In particular, the part of subsidies that more likely to be affected is the one from the national renewable energy tariff additional fund. The Ministry of Finance has already revealed its intention to gradually reduce the number of new projects being eligible for the subsidies, and the subsidies will be replaced by revisions in waste treatment fees. It is intended that the power grid will directly determined if a new WTE plant is eligible for such subsidies. While there is no concrete details and timing of such arrangement, there are clearly downside risk on the tariff on new WTE projects, and the revisions in waste treatment fees may not necessarily able to totally cover the difference.

The plan to remove the subsidies also highlights the concerns of collecting the outstanding subsidies from the governments. These subsidies normally have a long collection period which raises market concerns of their collectability. The delay collection also has significant negative impact on the working capital of the waste management companies. Due to such long outstanding receivable, most of the WTE companies have elevated gearing and the needs for potential cash call are high, which is one of the key risks of the sector.

3. Weak power demand due to economic slowdown

One challenge faced by the WTE companies in the next two years is the general weakness of the global economic environment, which is expected to negatively flow to the Chinese economy. This is mostly due to the COVID-19 outbreak early this year, which led to the disruption of the global demand and supply chain as people around the world are in lockdown. In the first four months of this year, China's power demand has declined by 4.7% YoY, reflecting the negative impact of the pandemic on China's economy. In fact, with China's economic slowdown in the last two years, the power demand growth rate has decelerated from 8.5% in 2018 to 5.6% in 2019 (Figure 25).

Figure 25: Growth in China's power consumption



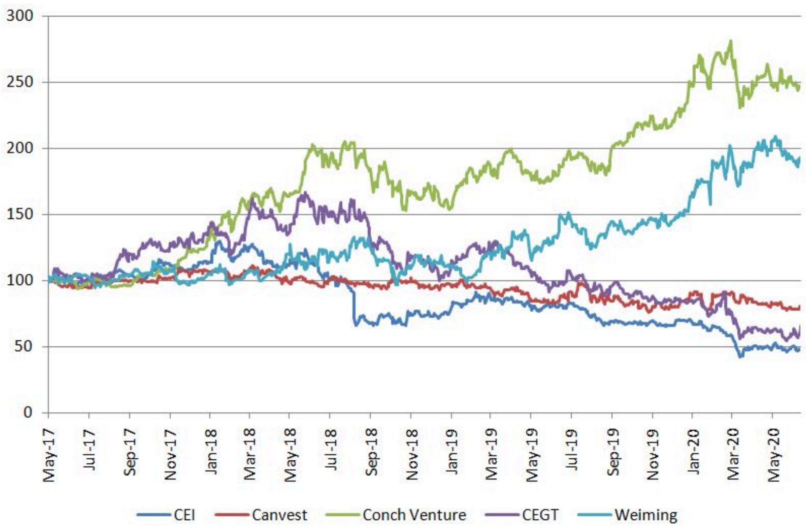
Source: National Bureau of Statistics

The COVID-19 outbreak has raised the concerns of the developed countries on their over-reliance on China for strategic supplies like Personal Protection Equipment (PPE) and pharmaceutical products. This has led to the growing trend of diversifying manufacturing away from China, reversing the globalisation trend in the last 20 years after China's entry into the World Trade Organisation. This structural change is likely to slow down China's manufacturing activities going forward and potentially lead to a lower power demand. While WTE remains one of the priority power generation mode, we do not see the industry to be unscathed and this is a challenge that all players in this segment need to face.

Relative valuation

Since China Everbright Greentech (1257 HK) was only listed in May 2017, we use such date as our base date for performance comparison of the five waste treatment companies covered in this Original. The performance of these five stocks is mixed during such period, with China Conch Venture Holdings (586 HK) (Conch Venture) and Zhejiang Weiming Environment (603568 CH) (Weiming) outperformed Canvest Environmental Protection Group (1381 HK) (Canvest), China Everbright Greentech (1257 HK) (CEGT) and China Everbright Intl (257 HK) (CEI) by very significant margins (Figure 26). CEI is the worst performing stock as it underperformed the peers massively - its share price was off 52% over the period. The weakness of CEI is primarily due to its heavy outstanding receivables from government subsidies and the resultant high gearing. Meanwhile, share prices of Conch Venture and Weiming have risen by 146% and 94%, respectively, driven by the solid profitability growth, a very high visibility of their future capacity increase and their sound financial position.

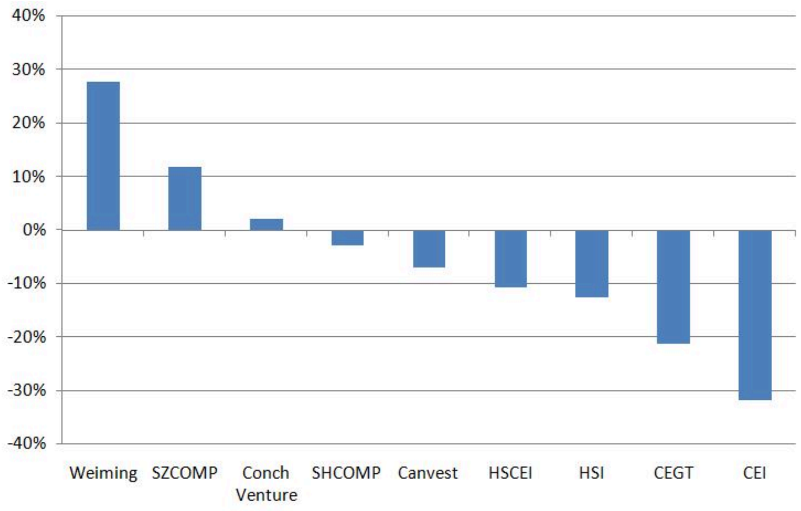
Figure 26: Performance since May-2017 (Rebased, 8 May 2017 = 100)



Source: Wind

The business nature of waste treatment companies is more stable than many other sectors in China. It is also less affected by the COVID-19 outbreak than the domestic consumption and cyclical companies. Nonetheless, many of them are of small size (based on market capitalisation) which made them unable to escape from the overall sell down of the market in Feb-Mar. As such, YTD, only Conch Venture and Weiming have managed to outperform most China and Hong Kong equity market indices, with the rest stayed as underperformers. The underperformance is most significant for CEGT and CEI, which lagged behind the HSI by 8.6pp and 19.1pp, respectively (Figure 27).

Figure 27: YTD performance

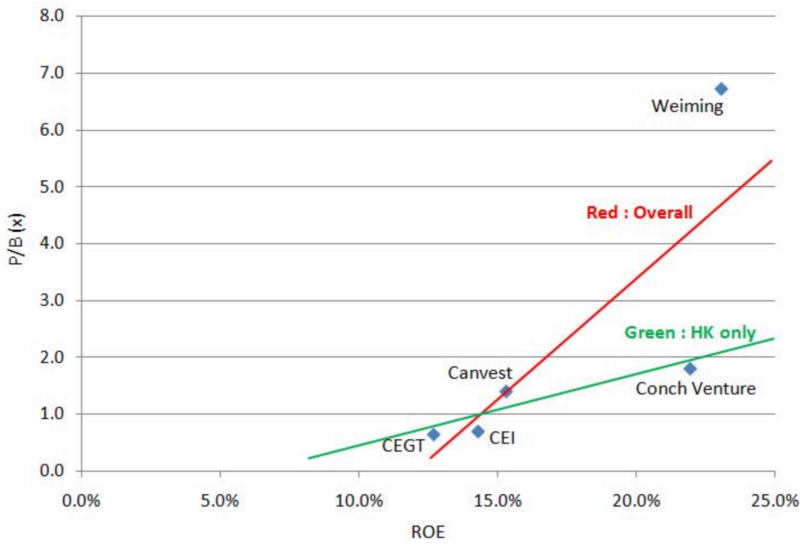


Source: Wind

We continue to look at the relative valuation of the sector stocks by making references to the P/B vs. ROE ratio and PEG perspectives, similar to our two previously published Smartkarma Originals - China Infrastructure Deep Dive: Gas Utilities H & A Shares and China Aerospace & Defense A Shares: An In-Depth Walkthrough.

We compare the stocks' P/B vs. ROE ratios to assess the valuation of individual stock relative to its peers. On such basis, Weiming is a clear overvalued member in the sector, but to a large extent, this is due to its position as the only A-share company in the list (Figure 28). As one would understand, the A-shares are generally trading on higher multiples than their Hong Kong peers. However, one should also note that Weiming has the highest ROE among the five stocks covered in this Original, and this lends support to its apparently high valuation. Relative to Weiming, both CEI and Conch Venture look undervalued as they all lie below the sector valuation line (Red line), particularly for Conch Venture. If we just take the Hong Kong listed companies as a group, while CEI and Conch Venture still look attractively priced on P/B vs. ROE basis relative to the other two, the extend is not as much as all four Hong Kong names are quite close to the sector valuation line (Green line).

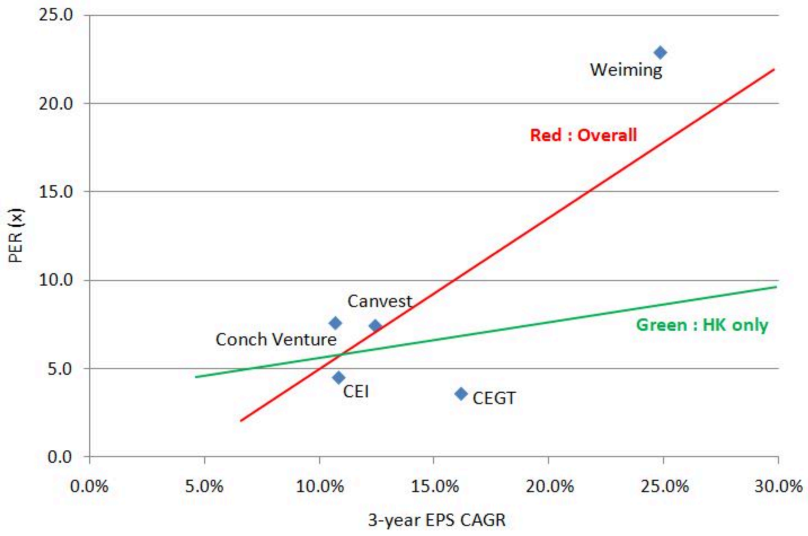
Figure 28: P/B vs. ROE



Source: Eastmoney Choice, Wind

Weiming also looks to be at the overvalued region on a PEG perspective, again on the same reason. Interestingly, in terms of 3-year EPS CAGR, it is also the highest in the sector with a 25% growth, based on Wind consensus. The Hong Kong listed companies, however, are close to each other as a cluster. And among these four Hong Kong names, the most undervalued are CEI and CEGT, not surprising due to their weak share price performance over the last three years. However, given that all these four stocks do not deviate too much from the sector valuation line, we think that the extend for the relative valuations of these companies being significantly overvalued or undervalued is limited. In our view, the one that stands out as comparatively inexpensive is CEGT - the stock trades on 3.6x FY20F PER with a 3-year EPS CAGR of 16.2% (Figure 29). However, Conch Venture, which looks to be undervalued on P/B vs. ROE basis, is slightly overvalued relative to its peers on PEG measure.

Figure 29: PER vs. 3-year EPS CAGR



Source: Eastmoney Choice, Wind

Stocks ranked

1. Canvest Environmental Protection Group (1381.HK)

We like Canvest Environmental Protection Group (1381 HK) (Canvest) for its pure exposure to the WTE market in China and its excellent position to benefit from the government measures to be introduced following the implementation of the Solid Waste Pollution Law. Its focus on Guangdong which has the most significant demand of waste treatment is another positive. We expect its solid project pipeline will generate highly visible earnings stream over the next three years, and the close working relationship with Shanghai Industrial Holdings (363 HK) (SIHL) will provide opportunities for it to expand into the Yangtze River Economic Belt. Among the five companies covered, we like Canvest the most. The only major drawback is its high gearing of 72.3%, but this is already lower than both CEI (91.4%) and CEGT (79.4%).

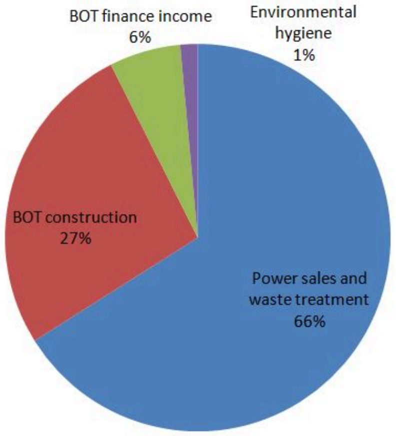
1.1 Background

Canvest is a leading WTE enterprise in China with its main business focuses include design, build and operate WTE plants. Canvest currently has WTE projects located in Guangdong, Guangxi, Guizhou, Jiangxi, Sichuan, Shandong, Shanxi, Hebei, Yunnan, Heilongjiang, Jiangsu, Liaoning and Shanghai. The company's daily municipal solid waste processing capacity of all the operating, secured and announced projects is around 50,000 tonnes. Canvest is a private enterprise with its controlling shareholders being Mr. L M Lai and Ms. Loretta Lee, founders of the company, holding a 54.7%

ownership, as at end-2019. Canvest is also the second largest shareholder of Hong Kong Johnson Holdings Co., Ltd (Johnson), a leading environmental hygiene service provider in Hong Kong, with a 30.75% stake.

Canvest's net profit grew by 18.3% to HK$892.6m in FY19 on the back of a 18.9% growth in revenue. Its gross margin remained virtually flat at 32% in FY19. Power sales and waste treatment generated the bulk of its profit, accounting for 66% of its gross profit in FY19. The second largest profit contributor to the company is BOT construction, which provided 27% of its gross profit (Figure 30).

Figure 30: Breakdown of FY19 gross profit



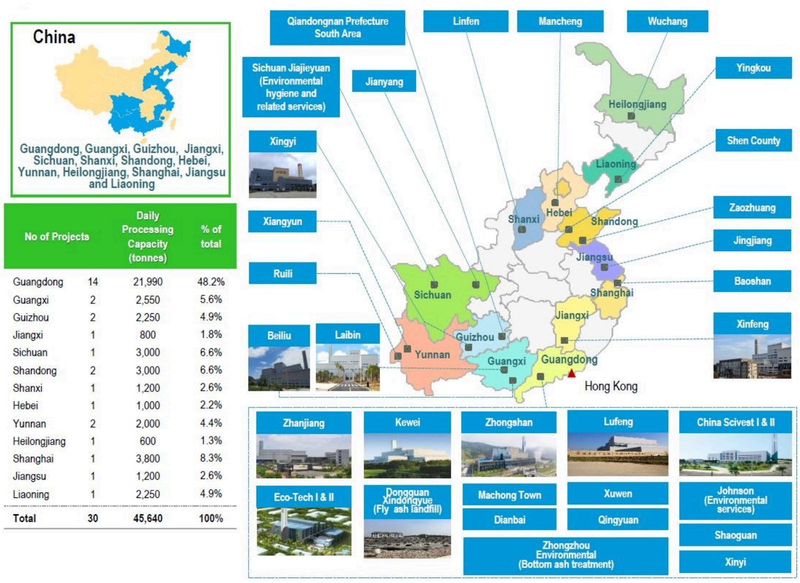
Source: Company data

We are not aware of any corporate governance issue with Canvest, even that privately owned enterprise (POE) normally has a high risk. Historically, there is no major connected transaction related to Canvest acquiring assets from the major shareholder or have significant connected transaction. The only major connected transaction is annual rental paid to the major shareholder Mr. L M Lai for office rental in China, with a cap of Rmb7m for FY19 and FY20. Also, there is no JV being set up by the company with the major shareholder. The presence of SIHL as the second largest shareholder with a significant stake should also add to the check of the company's corporate governance.

1.2 Investment thesis

Pure WTE play with established focus on Guangdong. Canvest has a very long history in the WTE business in China, dating back to Jun 2003 when the company is established and commenced construction of its first project in 2004. Unlike all other waste treatment companies covered in this Original which have diversified business activities, Canvest can be considered as a pure play on WTE, with a capacity (operational, under construction and in preparation) of 45,640 tonnes/day (Figure 31). Although it has invested in some other businesses including fly ash landfill, bottom ash treatment and environmental hygiene and took a 30.75% stake in Johnson, these investments only accounted for less than 4% of its profit and 3% of its total assets in FY19. Canvest has a comparatively simple business model and portfolio, and its revenue is basically generated from waste treatment fees, on-grid power sales and BOT construction. Hence, it is best positioned to see significant benefit from the implementation of the Solid Waste Pollution Law by the government.

Figure 31: Geographical coverage of WTE projects

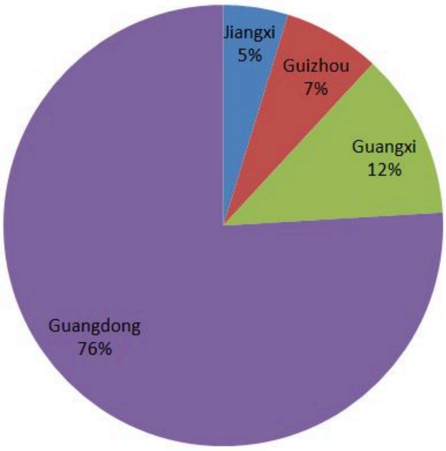

China
Guangdong, Guangxi, Guizhou, Jiangxi, Sichuan, Shanxi, Shandong, Hebei, Yunnan, Heilongjiang, Shanghai, Jiangsu and Liaoning
Qiandongnan Prefecture South Area
Linfen
Mancheng
Wuchang
Sichuan Jiajieyuan (Environmental hygiene and related services)
Jianyang
Yingkou
Xingyi
Shen County
Xiangyun
Zaozhuang
Jingjiang
Ruili
Baoshan
Beiliu
Laibin
Xinfeng
Heilongjiang
Liaoning
Shanxi
Hebei
Shandong
Jiangsu
Shanghai
Sichuan
Jiangxi
Guizhou
Yunnan
Guangxi
Guangdong
Hong Kong
Zhanjiang
Kewei
Zhongshan
Lufeng
China Scivest I & II
Eco-Tech I & II
Dongguan Xindongyue (Fly ash landfill)
Machong Town
Xuwen
Johnson (Environmental services)
Dianbai
Qingyuan
Shaoguan
Zhongzhou Environmental (Bottom ash treatment)
Xinyi

No of Projects		Daily Processing Capacity (tonnes)	% of total
Guangdong	14	21,990	48.2%
Guangxi	2	2,550	5.6%
Guizhou	2	2,250	4.9%
Jiangxi	1	800	1.8%
Sichuan	1	3,000	6.6%
Shandong	2	3,000	6.6%
Shanxi	1	1,200	2.6%
Hebei	1	1,000	2.2%
Yunnan	2	2,000	4.4%
Heilongjiang	1	600	1.3%
Shanghai	1	3,800	8.3%
Jiangsu	1	1,200	2.6%
Liaoning	1	2,250	4.9%
Total	**30**	**45,640**	**100%**

Source: Company data

Canvest started off its WTE business by focusing on the Guangdong market. It has a total daily waste processing capacity of 21,990 tonnes, or 48.2% of its total capacity, including projects in operations, under construction and in preparation, in the province. Although the company has now expanded to 13 provinces and municipalities, its projects in these provinces are mostly either under construction or in preparation. As of end-FY19, it has 15,890 tonnes of capacity are operational, of which 76% of them are in Guangdong (Figure 32). In the near term, the province will continue to be a key driver for its profitability. As we discussed earlier, Guangdong has consistently ranks as the number one province of domestic waste production, such industry characteristic will continue to protect Canvest's profitability before its operations in other provinces start to provide meaningful contribution.

Figure 32: Breakdown of operational capacity by province (end-FY19)

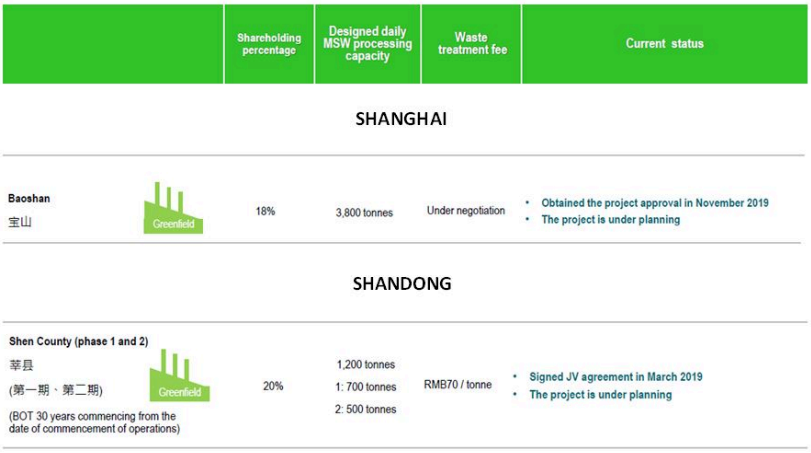


Source: Company data

Benefiting from strategic relationship with SIIC and Baowu. Shanghai Industrial Holdings (363 HK) (SIHL) has been a cornerstone investor of Canvest since its IPO. SHIL has increased its stake in Canvest from 3.3% in IPO to 17.6% at end-FY19, and is now the second largest shareholder after the founders' family. Canvest has benefited from the strategic relation with SIHL and through SIHL, with China Baowu Group (Baowu). In 2019, Canvest signed a strategic cooperation framework agreement with SIIC Environment Holdings (807 HK) (SIIC Environment) and Baowu Group Environmental Resources Technology Co., Ltd (Baowu Environment), subsidiaries of SIHL and Baowu respectively. The framework agreement involve collaboration related to environmental technology, exploration of functional transformation opportunities of iron and steel industrial parks in selected cities to establish more high-quality and modern environmental projects in the Yangtze River Economic Belt. We believe the framework agreement could provide significant new project opportunities for Canvest, given the strong background of both of its two partners.

The cooperation with SIHL has already turned into new project confirmation (Figure 33). For example, Canvest cooperated with Shanghai Fudan Water Engineering Technology Co., Ltd, a subsidiary of SIIC Environment, to invest in the Shen County WTE project in Shandong in Mar 2019. In Shanghai, it has established a company with SIIC Environment in Nov 2019, and through this company, cooperated with Baowu for the investment, construction and operation of a WTE project in Shanghai. The project has a daily processing capacity of 3,000 tonnes for residual waste and 800 tonnes for household food waste. In just less than a year after the signing of the framework agreement, Canvest has already sealed two projects involving SHIL and Baowu. In our view, this is only the start of an extensive cooperation, and more projects will follow the momentum in last year.

Figure 33: Details of the two cooperation project with SIIC and Baowu

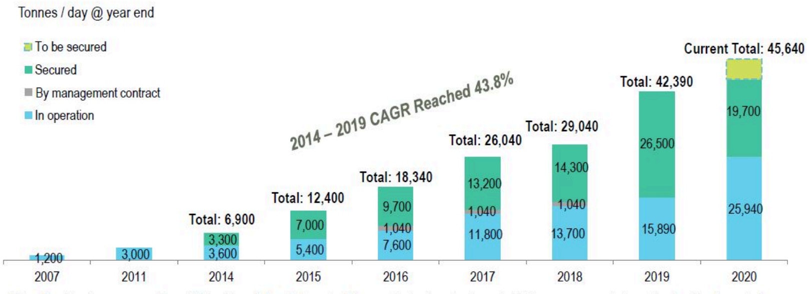


		Shareholding percentage	Designed daily MSW processing capacity	Waste treatment fee	Current status
SHANGHAI					
Baoshan 宝山	Greenfield	18%	3,800 tonnes	Under negotiation	• Obtained the project approval in November 2019 • The project is under planning
SHANDONG					
Shen County (phase 1 and 2) 莘县 (第一期、第二期) (BOT 30 years commencing from the date of commencement of operations)	Greenfield	20%	1,200 tonnes 1: 700 tonnes 2: 500 tonnes	RMB70 / tonne	• Signed JV agreement in March 2019 • The project is under planning

Source: Company data

Encouraging pipeline with strong FY20 completion. Canvest has been able to achieve a very strong project pipeline - with the growth in total capacity reached a CAGR of 43.8% between FY14 and FY19. In terms of operational capacity, this has increased from 3,600 tonnes/day in FY14 and 15,890 tonnes/day in FY19, or a 3.4x growth over the period (Figure 34). Driven by such momentum, Canvest has registered a 3.7x increase in profit in the last five years. In our view, this demonstrated Canvest's capability of executing its secured projects and translating them into profit. Nonetheless, the rapid capacity increase is backed by an elevation in its gearing from a net cash position in FY14 to 72.3% in FY19. Further capacity expansion will likely to raise its leverage and finance costs.

Figure 34: Canvest's project pipeline history and outlook



Note: The data above assumes all greenfield and brownfield projects require 2-3 years planning / construction period before commencement of operation; therefore, forecasts for 2019/2020 may not reflect the actual situation

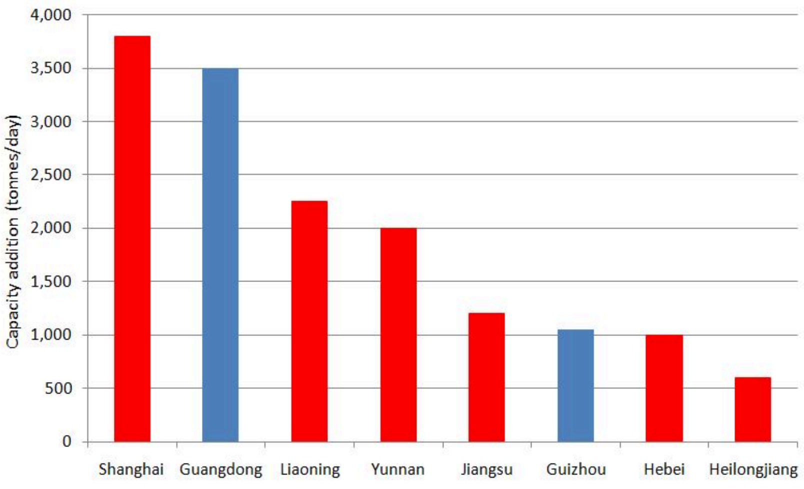
Source: Company data

For FY20, there will be a huge leap of 63% in its operational capacity to 25,940 tonnes/day. Key projects to be completed include those in Guangdong (Xinyi, Dianbai I, Xuwen, Machong and Shaoguan I), Shandong (Zaozhuang I & II), Sichuan (Jiangyang I), and Yunnan (Ruili I). Beyond FY20, Canvest still has another 19,700 tonnes/day of capacity to complete construction, contributing positively to Canvest's earnings in the next three years. Moreover, this has not taken into account the new projects to be secured over this period. In addition to greenfield projects, Canvest is looking into brownfield projects by acquiring more poorly managed or fluidised bed projects with the aim to achieve higher operational efficiency by upgrading their existing technology or inefficient moving grate plants so as to enjoy a higher return. We see this strategy will allow Canvest to beef up its pipeline via acquisitions of inefficient WTE plants or government privatisations.

Geographical expansion and acquisition to boost presence. In terms of pollution regulations, Guangdong is at the forefront in China. For example, under the “Law of Guangdong Province on the Prevention and Control of Environmental Pollution by Solid Waste” and “Law of the Guangdong Province on the Prevention and Control Atmospheric Pollution” which came into effect on 1 March 2019, the local government has required more stringent emission standards. Given that 76% of Canvest's operational projects (by capacity) are in Guangdong, this is an important credential for the company. Canvest's established presence in a province with high regulatory requirements is a strong selling point for its expansion to other provinces, supporting its geographical expansion strategy.

In FY19, Canvest has made good progress in geographical diversification and added projects in 6 new provinces and municipalities. These include the Mancheng project in Hebei, Ruili project in Yunnan, Wuchang project in Heilongjiang, Baoshan project in Shanghai, Jingjiang project in Jiangsu, and Yingkou project in Liaoning. On aggregate, they have a daily capacity of 15,400 tonnes and out of the total new project additions, 70% of them are from new provinces (Figure 35). In other words, most of Canvest's wins in FY19 are come from geographical expansion. We believe this provides evidence to Canvest's ability to export its business model and technology outside of Guangdong.

Figure 35: New capacity secured in FY19 by province (Red = New provinces/municipality)



Source: Company data

We also believe that Canvest stands to benefit from the acquisition opportunities posed by the Solid Waste Pollution Law. Its established track record as a pure WTE investor and operator suggests that its technological capability and execution ability are solid. This will allow the company to consolidate smaller players in the industry and provide room for raising their efficiency post-acquisitions.

1.3 Key risks

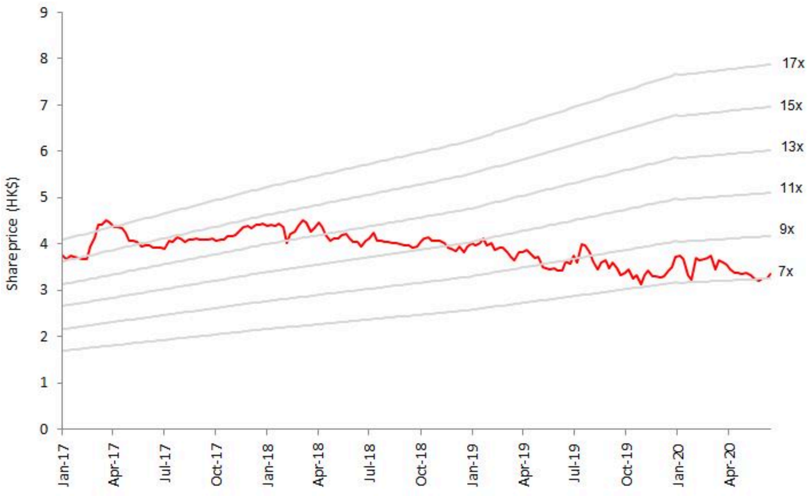
The key risks for Canvest are: 1.) unfavourable change in WTE on-grid tariffs; 2.) weak profitability of or inability to secure new projects; 3.) delay in construction of pipeline projects; 4.) overaggressive expansion that put pressure on balance sheet (FY19 gearing = 72.3%); and 5.) unexpected negative issues related to corporate governance.

1.4 Valuation

Canvest's share price declined by 19.5% since 2017, outperforming that for CEI and CEGT, but underperformed Conch Venture and Weiming. It is now trading on 7.4x PER, compared with the range of 6.9-17.7x over the last three years (Figure 36). The depressed valuations are driven by the worries on the sector including revision in on-grid tariff and the government's intention to remove subsidies for WTE plants.

Canvest trades at a slight premium to its Hong Kong peers on the basis of both P/B vs. ROE and PEG measures, which are justified by its pure business model and better financial position. Despite ongoing expansion, its gearing, though high at 72.3%, is lower than both CEI and CEGT. The ability to leverage on its relation with strategic shareholder SIHL is also an edge for above-sector multiples.

Figure 36: Canvest - P/E Band



Source: Eastmoney Choice

2. China Conch Venture Holdings (586.HK)

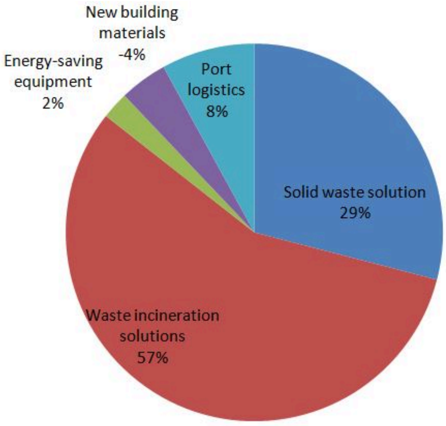
In our view, China Conch Venture Holdings (586 HK) (Conch Venture) has the unique edge of focusing on cement kilns waste incineration solutions, which is unmatched by other players in China's waste treatment industry. Its solid project pipeline has secured an excellent earnings stream over the next three years. An added strength is the strong execution ability with new project additions beating its targets over the last several years. We also like its solid financial position with a gearing of just 7.2% and the fact that it is majority owned by employees and senior management. As a result, we have Conch Venture as one of the two top picks in China's waste treatment sector. Our only key concern is that its effective 17.8% stake in Anhui Conch Cement Co Ltd H (914 HK) (Conch Cement) will still account for over 80% of its earnings, meaning that the exposure to the cement industry in China is significant. For investors do not want the exposure to the cement sector, this can be structured through a long Conch Venture, short Conch Cement trade.

2.1 Background

Conch Venture provides "package" solutions for energy conservation and environmental protection. Its businesses cover four key areas: energy conservation, environmental protection, new building materials and port logistics. The company’s operations involve domestic waste treatment, solid waste and hazardous waste disposal, sewage treatment, new building materials, port logistics, waste heat power generation, high-efficiency energy-saving vertical mill, etc. At the end of 2019, Conch Venture has a diversified shareholder base with senior management and employees own a total of 46.3% stake. The company also owns an effective 17.8% stake in Anhui Conch Cement Co Ltd H (914 HK) (Conch Cement), as at the end of 2019.

Net profit of Conch Venture rose 17.6% to Rmb7bn in FY19, driven by a combination of 77.2% surge in revenue and a 13.9% growth in contribution from associated companies (mostly from Conch Cement). However, its gross margin contracted by 4.5pp in FY19 to 34.4%. Excluding Conch Cement, waste incineration solutions is the most important earnings contributor, accounting for 57% of its net profit (ex-Conch Cement) in FY19 (Figure 37). This is followed by solid waste solution business which generated 29% of its net profit, also ex-Conch Cement.

Figure 37: Breakdown of FY19 net profit (ex-Conch Cement)



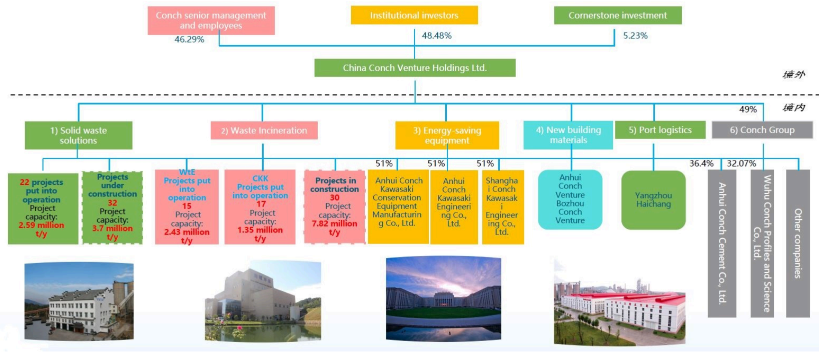
Source: Company data

As a company majority-owned by the employees, we see Conch Venture has reasonable level of corporate governance. Tracking the historical record of the company, we did not see any issue related to its corporate governance. While there are some connected transactions, these are mostly related to Conch Cement, but the amount is manageable - Rmb179m of sales from Conch Cement in FY19, or 4% of total. Its diversified shareholder base with a significant portion of cornerstone and institutional investors also helped to ensure quality corporate governance.

2.2 Investment thesis

Pioneer in cement kiln waste treatment solutions. Conch Venture is a unique player in China's environmental industry as it is a pioneer in cement kilns waste incineration solutions. Such technology enjoys the advantages of low investment cost, short construction period, large single-project treatment capacity and low unit cost. Unlike most other Chinese waste treatment companies which are majority owned and controlled by a single parent group or individual/family, Conch Venture is majority owned by its employees (46.3%), with the remaining stakes owned by cornerstone investors, including China National Building Material (3323 HK) (CNBM), TCC Investment Group, and Asia Cement (China) Holdings Corporation (5.2%), and institutional investors (48.5%) (Figure 38). We believe this will make sure that the management's interests are significanty aligned with those of the shareholders and minority interests are protected with high corporate governance standard.

Figure 38: Corporate structure of Conch Venture

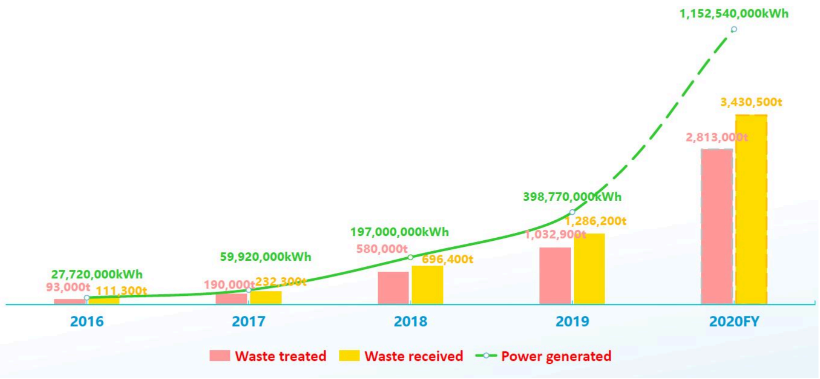

Conch senior management and employees
Institutional investors
Cornerstone investment
46.29%
48.48%
5.23%
China Conch Venture Holdings Ltd.
境外
境内
49%
1) Solid waste solutions
2) Waste Incineration
3) Energy-saving equipment
4) New building materials
5) Port logistics
6) Conch Group
22 projects put into operation Project capacity: 2.59 million t/y
Projects under construction 32 Project capacity: 3.7 million t/y
WtE Projects put into operation 15 Project capacity: 2.43 million t/y
CKK Projects put into operation 17 Project capacity: 1.35 million t/y
Projects in construction 30 Project capacity: 7.82 million t/y
51%
51%
51%
Anhui Conch Kawasaki Conservation Equipment Manufacturing Co., Ltd.
Anhui Conch Kawasaki Engineering Co., Ltd.
Shanghai Conch Kawasaki Engineering Co., Ltd.
Anhui Conch Venture Bozhou Conch Venture
Yangzhou Haichang
36.4%
32.07%
Anhui Conch Cement Co., Ltd.
Wuhu Conch Profiles and Science Co., Ltd.
Other companies

Source: Company data

Leveraging on its ownership in Conch Cement, Conch Venture has been able to secure a strong growth pipeline since its inception. The solid project momentum has backed its earnings (excluding Conch Cement) growth of 140% between FY15 and FY19. In our view, the company's technological knowhow and the relation with CNBM and other cement companies will be instrumental for it to capture the opportunities created by the Solid Waste Pollution Law. Conch Venture will see its cement kilns waste incineration best catered to the stricter requirements to handle industrial, hazardous and solid waste under the Law. The potential improvement in pricing for waste treatment as induced by the Law will also lift the return on its WTE projects.

Unique edge in waste incineration. Conch Venture mainly employs its technologically-advanced grate incinerator in its WTE projects. The technology of grate furnace adopts staged combustion, which ensures full and thorough waste combustion. The high temperature flue gas generated by incineration drives the steam turbine to generate electricity through the steam generated by the waste heat boiler, which truly realizes the recycling of waste treatment. Such technology also allows its WTE plants to reach national and EU standards for dioxin emissions. From FY16 to FY19, the total amount of waste treated has undergone a 10-fold increase, with average of 82.2% of incoming wastes treated. Moreover, total power generation has leapt by an even higher rate of 13.3x, suggesting increased efficiency for the plants. The company's target for FY20 calls for a 1.9x increase in power generation on the back of a 1.7x rise in waste treated (Figure 39). In other words, efficiency is expected to further improve in this year, and this should be positive to the margin for its WTE business.

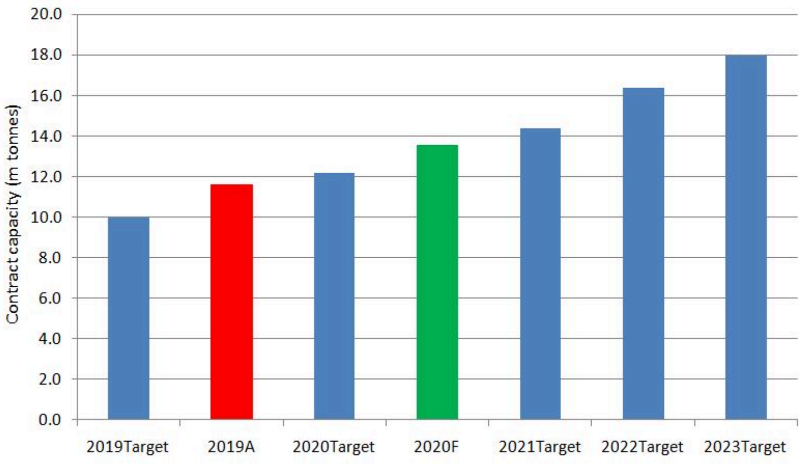
Figure 39: Volume of waste treated and power generated



Source: Company data

Conch Venture maintained a positive momentum in winning new WTE projects. Between FY16 and FY19, its contracted capacity increased by 6x. In FY19, it secured 22 new projects across 11 provinces with a capacity of 5.16m tonnes annually, with key additions at Yunnan, Anhui and Hunan. At end-FY19, it has a total contracted waste incineration capacity of 11.6m tonnes, surpassed its target of 10m tonnes for the year. About 21% of such capacity, or 2.43m tonnes, has already completed. The company has an aggressive plan of reaching a total contracted capacity of 18m tonnes by end-FY23 (Figure 40). If such target is reached, it will imply a growth rate of 11.6% for FY19-23, and will drive it long term WTE growth prospects. In fact, even based on the current pipeline, the growth of completed capacity will be over 40% over the next four years, propelling its earnings outlook in the medium term.

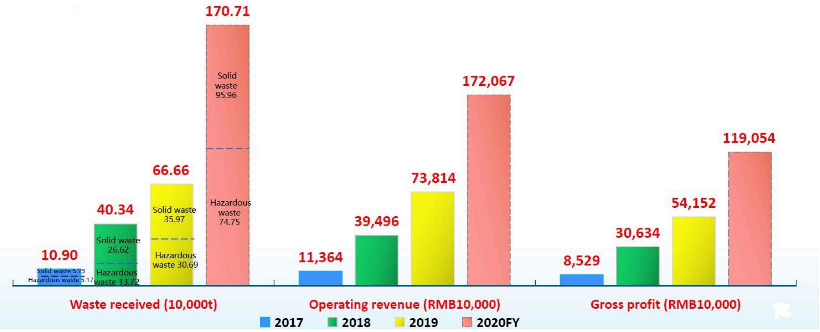
Figure 40: Contract scale for waste incineration



Source: Company data

Solid waste solution is a growth engine. Conch Venture is the first in the world to offer innovative waste incineration systems that utilise cement kilns to neutralise hazardous substances, primarily dioxins, in gaseous emissions from incineration. Its own independently developed technology for collaborative disposal of industrial solid and hazardous wastes by using cement kilns have the advantages of high combustion temperature, complete waste treatment and no ash discharge. As such, the company has successfully won many solid waste solution contracts over the years. Its operational and financial track records for solid waste solution are impressive. Between FY17 and FY19, total hazardous and solid waste treated has increased by 5x and the gross profit up by 5.4x. According to its plan for FY20, volume of waste treated and gross profit will increase by another 156% and 120% YoY, respectively (Figure 41).

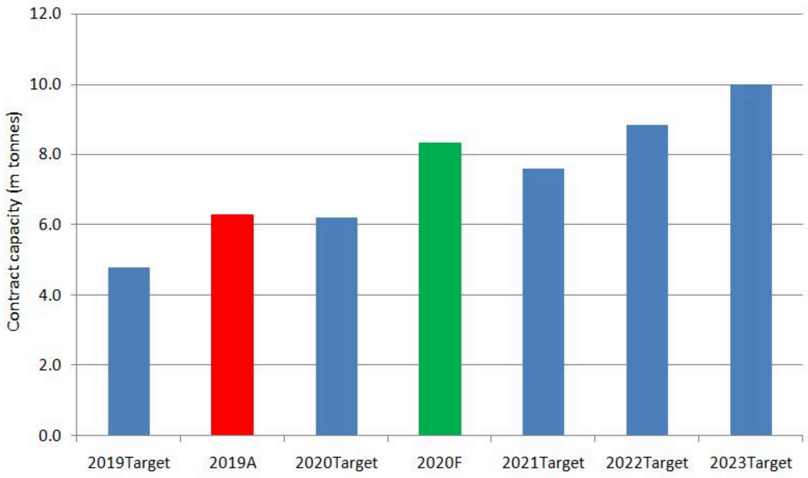
Figure 41: Volume of hazardous and solid waste treated and profit history



Source: Company data

Conch Venture has seen very solid achievement in securing new projects. In 2019, it added 32 solid waste treatment projects with a treatment capacity of 3.5m tonnes annually. They are mostly come from Conch Cement (9) and CNBM and Inner Mongolia Mengxi Cement Group (16), among others. These additions have boosted its total contract on hand to a capacity of 6.3m tonnes, of which 2.6m tonnes have already completed. In fact, the end-FY19 total contract capacity has, again, already surpassed its target of 4.8m tonnes. Based on its five-year plan, its total contract capacity will reach 10m tonnes by FY23, or a CAGR of 13% for FY20-23 (Figure 42). Given the solid historical record and its competitive strengths, we believe the target is on the conservative side. Its excellent pipeline momentum should support solid waste solution business as its key growth engine.

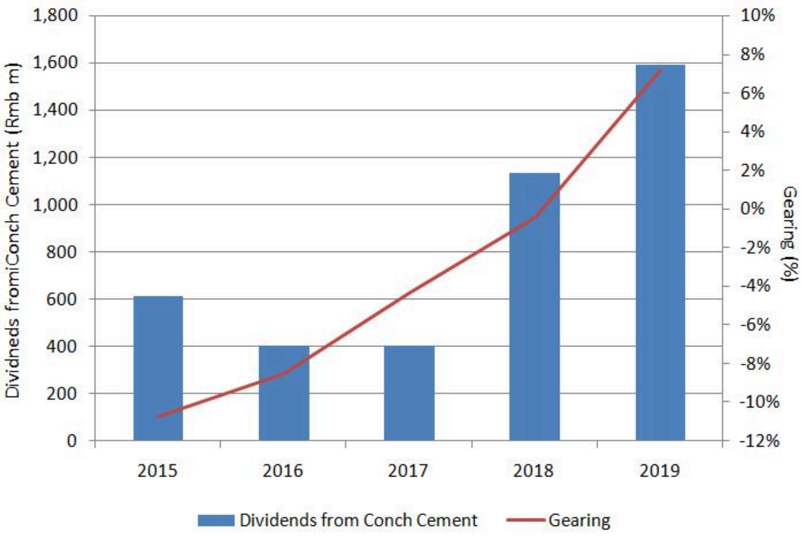
Figure 42: Contract scale for solid waste solution



Source: Company data

Comfortable gearing due to quality holding in Conch Cement. Conch Venture holds an effective 17.8% stake in Conch Cement, which is classified as an associate, and this has provided the company a strong stream of cash flow. Between FY15-19, its stake in Conch Cement has contributed an average 84% of its earnings. This passive holding has generated an aggregate of over Rmb4bn of cash flow in the form of dividends in the last five years, and has helped Conch Venture to maintain a low gearing even as it continues to expand its waste treatment and WTE projects. Although its gearing has been steadily increasing from net cash of 10.8% of equity in FY15 to net debt of 7.2% in FY19 (Figure 43), such level is still significantly lower than the sector average of 52.4% based on the five companies coverage in this Original. Despite such a low gearing, the company is still generating an ROE of 22%, suggesting the excellent profitability of its assets.

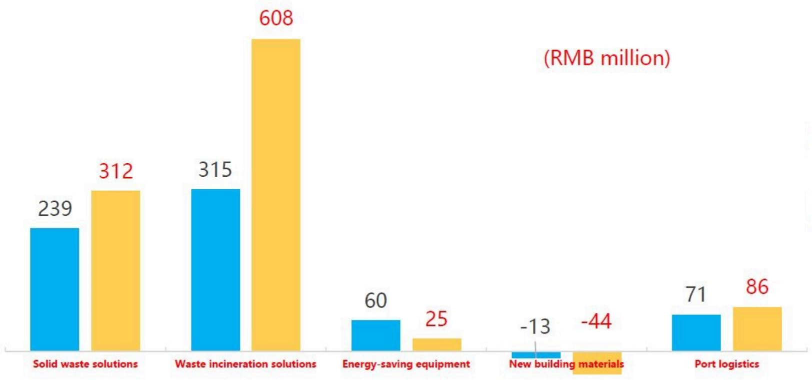
Figure 43: Dividends from Conch Cement and Conch Venture's gearing



Source: Company data

Conch Venture's other businesses include energy-saving equipment, new building materials and port logistics (Figure 44). On aggregate, these businesses accounted for about 6% of its profit (excluding Conch Cement and taking into account negative contribution from the new building material business) in FY19. These businesses have provided some diversifications to its core waste treatment operations, but the impact is relatively not material.

Figure 44: Net profit growth in FY19 by segment



Source: Company data

2.3 Key risks

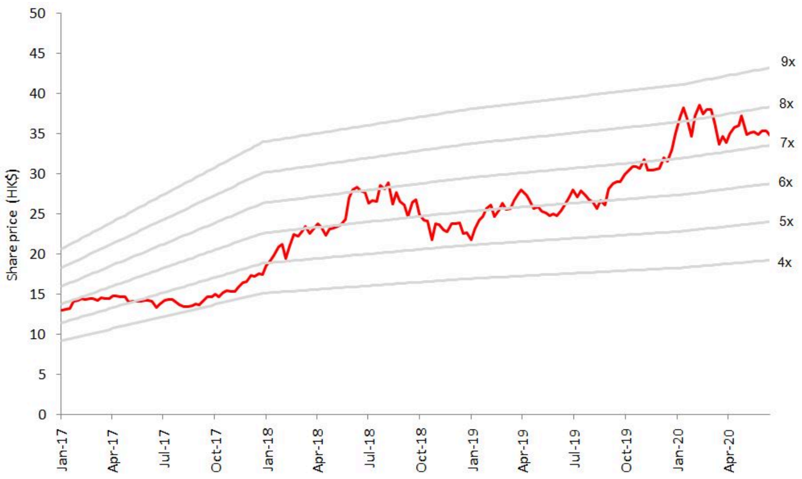
The key risks for Conch Venture are: 1.) unable to secure new projects or the pace is slower than expectation; 2.) delay in construction of its contracted projects; 3.) unfavourable change in on-grid tariff and subsidies; 4.) margin erosion due to inability to control cost; and 5.) weaker profit at its key associate Conch Cement.

2.4 Valuation

Conch Venture has a stellar performance since 2017, with its share price up by a massive 146%. This can be attributable to its strong earnings growth, which supports its current PER of 7.5x, the high end of the range of 4.1-8.4x in the last three years (Figure 45). We believe that the solid share price performance is also partly due to the fact that it is an alternative vehicle to play the rally of Conch Cement given its effective 17.8% stake - share price of Conch Cement has rallied by 265% since 2017.

The P/B vs. ROE valuation of Conch Venture is slightly below the sector valuation line, but on PEG, it is higher than the peers. Despite the solid share price performance, we do not see that valuations are too excessive given its ability to leverage on Conch Cement, CNBM and other cement companies to securing waste treatment and incineration projects. In our view, such competitive advantage justifies a premium valuation against the other Hong Kong-listed peers.

Figure 45: Conch Venture - P/E Band



Source: Eastmoney Choice

3. China Everbright International (257.HK)

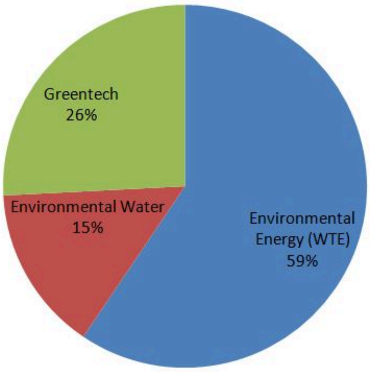
We believe the leadership position of China Everbright Intl (257 HK) (CEI) in China's environment sector is the most important investment positive for the stock. Its number one position in WTE, national coverage, exposure to the water treatment, greentech and new environmental businesses made it the true comprehensive environment company in China. However, its highest gearing, the worry on future cash call and the collection issues on government subsidies are the key drawbacks of the stock. In addition, its holdings in two listed companies, China Everbright Water (CEWL SP) and China Everbright Greentech (1257 HK) (CEGT), which contributed 41% of its EBITDA, are negative to its valuation due to a holding company discount, in our view. That said, even its current valuation at the low end of the historical range, it is still ranked behind Canvest and Conch Venture on our list of preferred waste treatment companies.

3.1 Background

CEI is a provider of one-stop shop integrated environmental solution in China. Its main businesses cover WTE and integrated waste treatment, biomass power generation, hazardous waste and solid waste treatment, environmental remediation, waste water treatment, reusable water, water supply, water environment management, waste sorting etc. CEI has presence in more than 190 locations across 23 provinces, municipalities and autonomous regions in China, as well as overseas markets of Germany, Poland and Vietnam. At the end of 2019, China Everbright Group is its controlling shareholder with a 42.01% ownership.

CEI reported a 20.5% growth in net profit to HK$5.2bn in FY19, driven by a 37.9% growth in revenue but partly offset by a 4.1pp contraction in its gross margin. Its profit is mainly generated from environmental energy (mostly WTE) segment which accounted for 59% of its EBIDTA in FY19. It is also the controlling shareholder of China Everbright Greentech (1257 HK) (CEGT) with a 69.7% stake. Greentech business accounted for 26% of its EBITDA in FY19. The environmental water business which operated through its 72.87%-owned China Everbright Water (CEWL SP) generated 15% of its EBITDA (Figure 46).

Figure 46: Breakdown of FY19 EBITDA

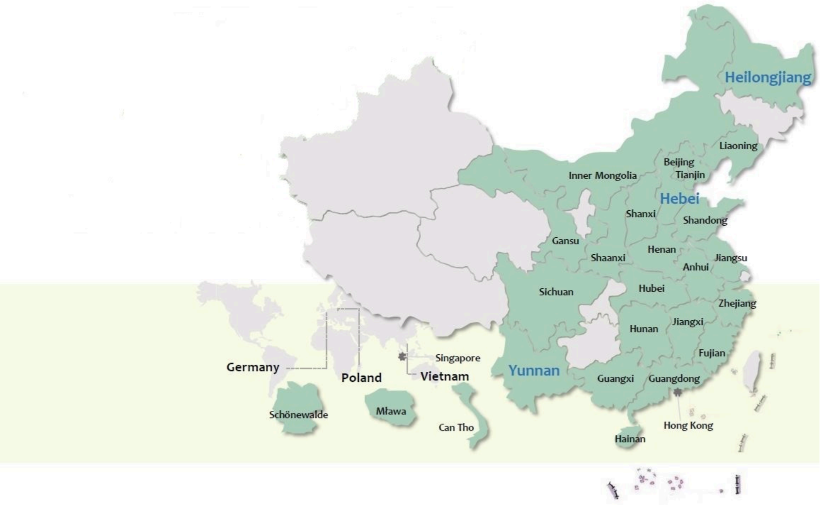


Source: Company data

3.2 Investment thesis

Leadership position in China's environmental sector. CEI can be considered as a truly national player in China's environmental sector with its operations covered 23 provinces, municipalities and autonomous regions in China. As at end-2019, its projects span across 187 locations as well as international locations including Germany, Poland and Vietnam (Figure 47). In terms of business scale, CEI is ranked as China's number one in waste processing capacity and WTE equipment sales, number two in hazardous waste treatment market, number three in biomass integrated utilisation (through its 69.7%-owned CEGT) and number four in waste water treatment (through its 72.87%-owned CEWL) . Such a comprehensive leadership in many major environmental business segments in China provides CEI the brand recognition for further expansion and protection to its all-rounded franchise; and these are its major competitive advantages when compared with its peers.

Figure 47: Geographical presence of CEI's projects

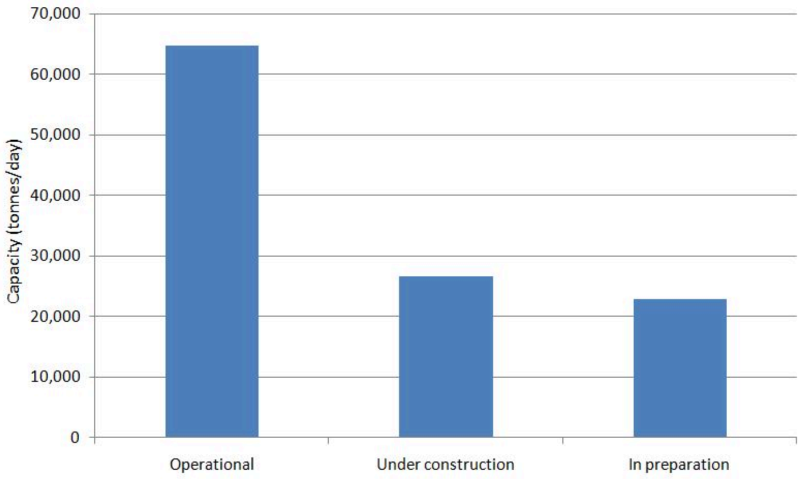

Heilongjiang
Liaoning
Beijing
Tianjin
Inner Mongolia
Hebei
Shanxi
Shandong
Gansu
Shaanxi
Henan
Jiangsu
Anhui
Sichuan
Hubei
Zhejiang
Jiangxi
Hunan
Fujian
Yunnan
Guangxi
Guangdong
Hong Kong
Hainan
Germany
Poland
Singapore
Vietnam
Schönewalde
Mlawa
Can Tho

Source: Company data

Supported by its geographical spread and strong new project sourcing ability, CEI has generated a CAGR of 42.7% and 25% in its revenue and net profit between FY14 and FY19. These are good track records that are sustainable given its leadership position; and it is well placed to capture the opportunities induced by the Solid Waste Pollution Law. We note that its growth in net profit growth has been weaker than that for its revenue. This is a result of: 1.) decline in operating margin from 42.2% in FY14 to 26.2% in FY19; and 2.) the 37% CAGR in finance costs due to capex. The rights issue in FY18 also diluted its EPS growth to just 17.4% over the last five years. While the strong pipeline has contributed to the profit growth, its balance sheet has experienced heavy pressure with a high gearing of 91.4% in FY19. The long collection period of subsidies from the government has taken up its working capital and contributed to such a high gearing. In our view, CEI's finance position is stretched and this may constrain its room to further secure new projects.

Major earnings driver from WTE business. The WTE business is CEI's major profit centre which contributed 59% of its EBITDA in FY19, with a 20.2% YoY growth. It has a total of 125 WTE projects, 18 food waste treatment projects, 5 sludge treatment and disposal projects, 3 leachate treatment projects, 2 methane-to-energy projects, 1 fecal treatment project, 1 fly ash landfill project, 1 medical waste treatment project and 1 solid waste treatment project. These projects have a total designed annual waste processing capacity of about 41.7m tonnes, or about 114,350 tonnes/day. At end-FY19, CEI has 73 WTE projects with total capacity of 64,850 tonnes/day are in operations, and this ranks it as the largest WTE enterprise in China. A further 25 WTE projects are currently under construction and 27 in the preparation stage (Figure 48). Given the solid pipeline from these projects, CEI's operational capacity is expected to increase by 76% over the next three years, supporting a positive momentum of its WTE business.

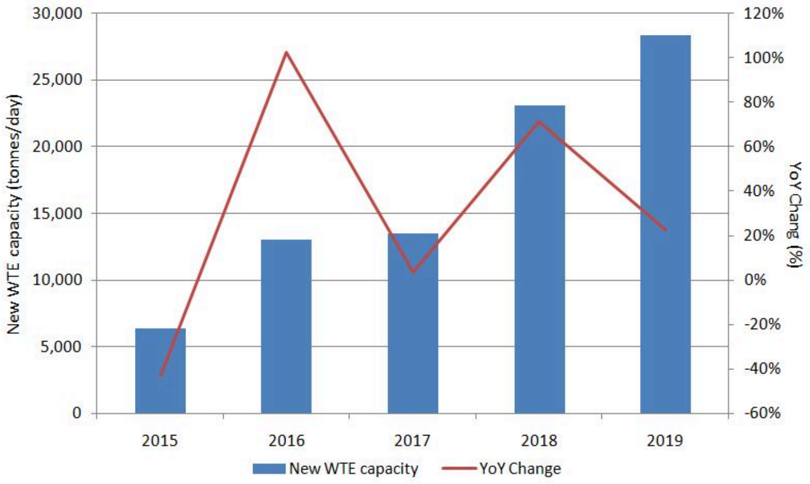
Figure 48: CEI's outstanding WTE projects at end-FY19



Source: Company data

Regarding new project momentum, the growth pace was solid in FY19. CEI secured 44 new projects and 2 supplementary agreements for its existing projects. These include 34 WTE projects with a daily capacity of 28,350 tonnes, with the remaining ones being food waste treatment projects, sludge treatment and disposal projects, leachate treatment project, and medical waste treatment project. In fact, over the last five years, CEI has maintained a solid new WTE project momentum, with increasingly more capacity being added every year (Figure 49). In FY19, CEI's newly added WTE projects accounted for one-third of the nationwide new projects. With its plan to achieve a market share of 20% in the domestic WTE business, we see this division to sustain as the company's most important earnings driver.

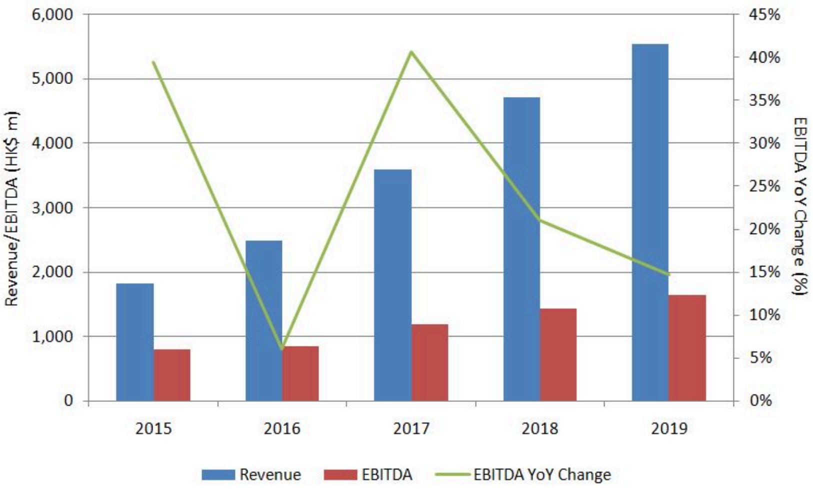
Figure 49: New WTE capacity



Source: Company data

Environmental water and greentech business add diversifications. CEI is the only company among the five companies covered in this Original that has a sizeable water treatment business. This business is operated through its 72.87%-owned China Everbright Water (CEWL SP) listed in both Singapore and Hong Kong. CEWL's key operations include raw water protection, water supply, municipal waste water treatment, industrial waste water treatment, reusable water, river-basin ecological restoration, and sludge treatment and disposal. At end-2019, CEWL had 1 raw water protection project, 3 water supply projects, 96 municipal waste water treatment projects, 12 industrial waste water treatment projects, 1 leachate treatment project, 8 reusable water projects, 6 ecological restoration of river-basin projects and 2 waste water source heat pump projects. Overall, such project profile ranks CEI as the fourth largest water treatment company in China. Over the last five years, CEI's environmental water business has seen its EBITDA rose by an impressive CAGR of 23.6%, making significant profit contribution to the company (Figure 50).

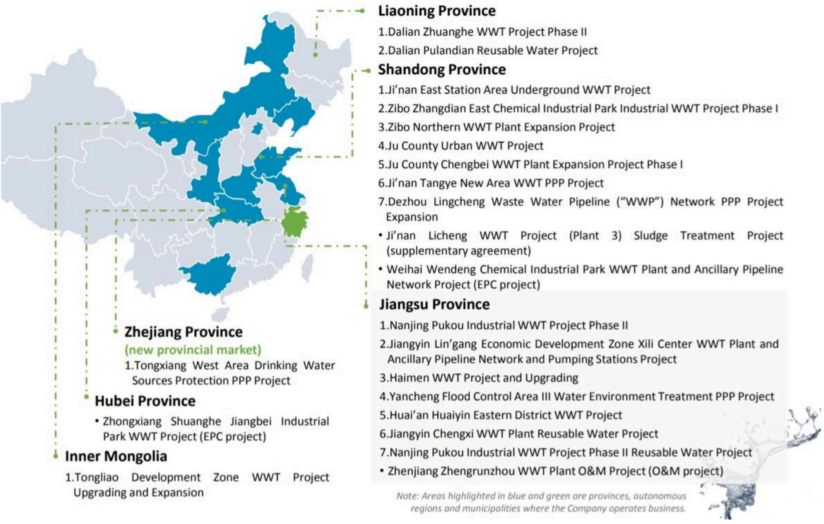
Figure 50: Revenue, EBITDA and EBITDA growth for CEWL



Source: Company data

New project momentum for CEWL is also encouraging, with a total of 18 new projects secured in FY19, boosting the daily waste water treatment capacity by 655,000 cu.m (Figure 51). Given that only half of its existing of water projects is currently in operations and the rest are still in construction, profit growth for the division has been secured over the next three years. This has yet to take into account the upside from water tariff - in FY19, CEI managed to raise its waste water treatment tariff by between 4% and 61%, and this is an added driver of the environmental water business.

Figure 51: New projects of CEWL in FY19


Liaoning Province
1.Dalian Zhuanghe WWT Project Phase II
2.Dalian Pulandian Reusable Water Project
Shandong Province
1.Ji'nan East Station Area Underground WWT Project
2.Zibo Zhangdian East Chemical Industrial Park Industrial WWT Project Phase I
3.Zibo Northern WWT Plant Expansion Project
4.Ju County Urban WWT Project
5.Ju County Chengbei WWT Plant Expansion Project Phase I
6.Ji'nan Tangye New Area WWT PPP Project
7.Dezhou Lingcheng Waste Water Pipeline ("WWP") Network PPP Project Expansion
• Ji'nan Licheng WWT Project (Plant 3) Sludge Treatment Project (supplementary agreement)
• Weihai Wendeng Chemical Industrial Park WWT Plant and Ancillary Pipeline Network Project (EPC project)
Jiangsu Province
1.Nanjing Pukou Industrial WWT Project Phase II
2.Jiangyin Lin'gang Economic Development Zone Xili Center WWT Plant and Ancillary Pipeline Network and Pumping Stations Project
3.Haimen WWT Project and Upgrading
4.Yancheng Flood Control Area III Water Environment Treatment PPP Project
5.Huai'an Huaiyin Eastern District WWT Project
6.Jiangyin Chengxi WWT Plant Reusable Water Project
7.Nanjing Pukou Industrial WWT Project Phase II Reusable Water Project
• Zhenjiang Zhengrunzhou WWT Plant O&M Project (O&M project)
Zhejiang Province
(new provincial market)
1.Tongxiang West Area Drinking Water Sources Protection PPP Project
Hubei Province
• Zhongxiang Shuanghe Jiangbei Industrial Park WWT Project (EPC project)
Inner Mongolia
1.Tongliao Development Zone WWT Project Upgrading and Expansion
Note: Areas highlighted in blue and green are provinces, autonomous regions and municipalities where the Company operates business.

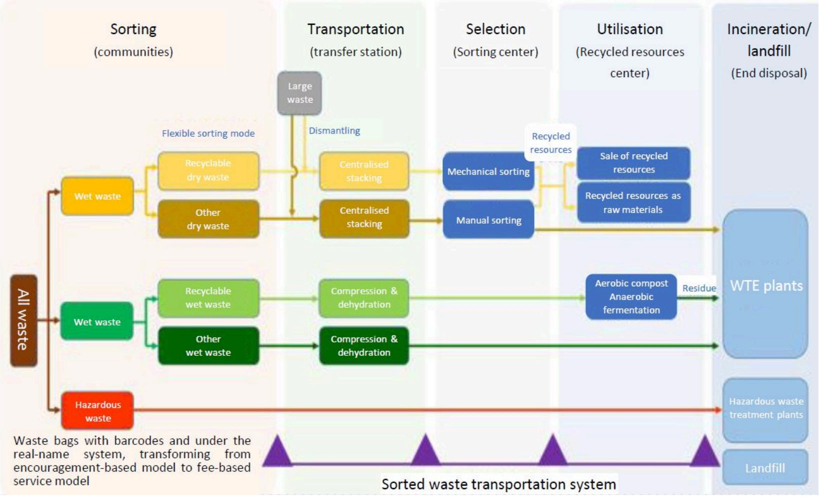
Source: China Everbright Water

CEI's greentech business is carried out through its subsidiary CEGT. The greentech division contributed 26% of the company's EBITDA. For further discussion on CEGT, please refer to the separate section in this Original. In our view, both CEWL and CEGT have added to CBI's business diversifications and are seeing quality earnings growth. However, as both companies are listed, this has contributed to CEI's holding company discount, in our view.

New business momentum from greenergy, eco-recycling and envirotech. In addition to traditional environmental business, CEI has expanded into new areas including greenergy and eco-recycling. Although these businesses will not make any material profit in the near term, they represent areas that will have long-term potential given China's increasing push for environmental preservation and protection. Greenergy involves energy-saving lighting for urban roads and other energy conservation industries. The division has secured two streetlight upgrading projects in Rizhao and Jinan through the energy management contract model, involving a total of 135,000 street lamps. CEI has also installed Everbright Greenergy Sodium Lamp, its major product, in demonstrative street areas in Beijing, Shenzhen, Nanjing and Hangzhou. These efforts are expected to cultivate for greenergy's potential entrance into these markets in the future.

Eco-recycling division of CEI involves in the development of a full industry chain from waste recycling and sorting to harmless treatment (Figure 52). The business focuses are waste sorting and zero-waste city, sanitation integration and resource recycling, providing customers with services including sorting, transportation, selection, utilisation and incineration of waste through integrated technology. The business now covers markets in Shandong, Yunnan, Gansu and Jiangxi, with a reach of nearly 1m population and recycling 10,000 tonnes of renewable resources annually through waste sorting.

Figure 52: CEI's eco-recycling business


Sorting
(communities)
Transportation
(transfer station)
Selection
(Sorting center)
Utilisation
(Recycled resources center)
Incineration/ landfill
(End disposal)
Large waste
Flexible sorting mode
Dismantling
Recycled resources
Recyclable dry waste
Centralised stacking
Mechanical sorting
Sale of recycled resources
Wet waste
Recycled resources as raw materials
Other dry waste
Centralised stacking
Manual sorting
All waste
Recyclable wet waste
Compression & dehydration
Aerobic compost Anaerobic fermentation
Residue
WTE plants
Wet waste
Other wet waste
Compression & dehydration
Hazardous waste
Hazardous waste treatment plants
Waste bags with barcodes and under the real-name system, transforming from encouragement-based model to fee-based service model
Sorted waste transportation system
Landfill

Source: Company data

Lastly, in terms of envirotech, CEI founded the China Everbright Green Technology Innovation Research Institute Limited in Hong Kong in 2019, with the aims to become a platform for the commercialisation of green technologies. It has also established its zero-waste city research institute in Xiongan New Area. With the support from its technology investments, CEI has successfully developed the first domestic large-scale household waste grate furnace with a daily waste processing capacity of 1,000 tonnes. We believe these initiatives will support its further expansion in the WTE market as well as the growth in the equipment sales business.

3.3 Key risks

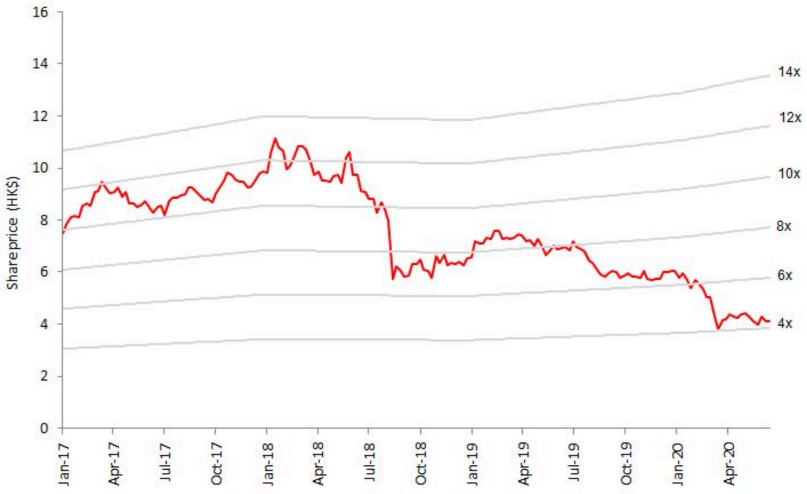
The key risks for CEI are: 1.) unfavourable change in WTE on-grid tariffs; 2.) inability to collect outstanding government subsidies; 3.) delay in construction of pipeline projects; 4.) negative change in the operational environment of water treatment business; and 5.) excessive expansion capex that put pressure on balance sheet.

3.4 Valuation

Among the five waste treatment companies covered in this Original, CEI is the worst performing one, with its share price declined by a massive 52% since 2017. It has de-rated from a peak PER of 13.1x to the current 4.3x (Figure 53), which is close to the historical low of 4x, on the back of the concern on delayed collection of government subsidies, removal of subsidies for WTE projects and the EPS dilution from cash calls.

While the stock does not look expensive relative to its peers, as reflected by its position at below the P/B vs. ROE ratio and PEG valuation lines (Figure 28 and 29), we see the above negative reasons to continue to weigh on the stock. Its gearing of 91.4% is the highest among all five waste treatment stocks and with further capacity expansion, this will weigh on its financial position and ability to seal new projects. Worry about further equity fund raising activity is also a negative factor that caps a re-rating for CEI.

Figure 53: CEI - P/E Band



Source: Eastmoney Choice

4. Zhejiang Weiming Environment Protection (603568 CH)

Zhejiang Weiming Environment (603568 CH) (Weiming) is the largest A-share waste treatment company and we believe it stands in a very strong position to reap the benefits of the Solid Waste Pollution Law. Its excellent technological capability is an important competitive advantage while the secured projects on hand will support the earnings outlook for the next three years. Although the diversification into hygiene treatment area will not provide significant near-term contribution, we see the initiative positive to its longer term profitability. However, the strong outperformance has made its valuation relatively rich.

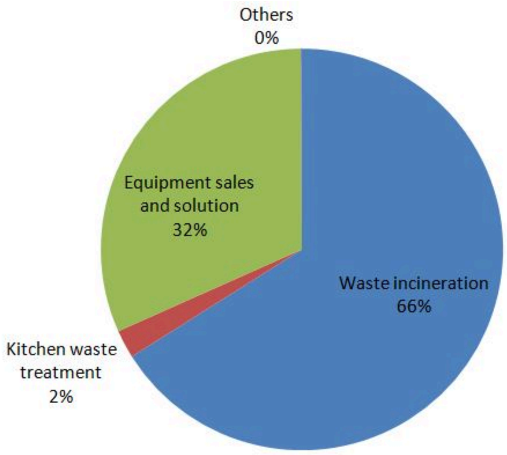
4.1 Background

Listed in the Shanghai Stock Exchange, Weiming is a privately-owned enterprise (POE) and has its key operations in solid waste treatment. Its businesses mainly focus on development of solid waste treatment project technology, equipment manufacturing and sales, project investment, project construction, operation management and other fields in domestic waste incineration. It has invested, constructed and operated more than 30 environmental protection industry projects. At end-2019, Weiming Group Co., Ltd is the controlling shareholder with a 43.16% stake. Chairman and CEO Xiang Guangming, together with Wang Suqin, Zhu Shanyu and Zhu Shanyin, collectively owned a 78.62% stake in Weiming's parent Weiming Group.

Net profit of Weiming rose 31.7% in FY19 to Rmb974m, driven by a similar level of growth in revenue and a 1.7pp expansion in gross margin (to 62%). Waste incineration is the most important source of earnings, generating 66% of its FY19 gross profit. This is then followed by equipment sales and solution which took up 32% (Figure 54). For 1Q20, the impact of the

COVID-19 outbreak has been manageable - net profit declined 15.4% to Rmb196m as revenue dropped by 9% and gross margin edged down a marginal 0.9pp.

Figure 54: Breakdown of FY19 gross profit



Source: Company data

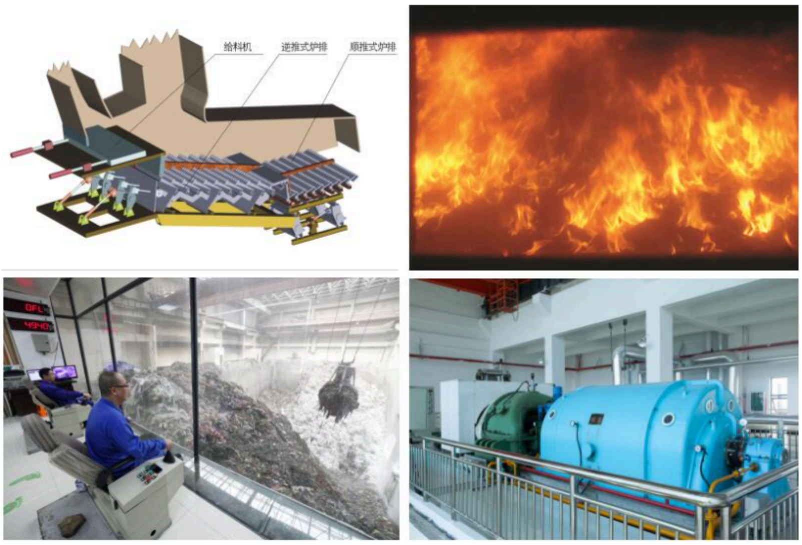
As an A-share company, it is important to take a deeper look into its corporate governance. We consider Weiming has a good level of corporate governance. There are limited connected transactions - no sales derived from the major shareholder or its controlled entities. No guarantee is made to and no fund is placed with or lend to the parent company or controlling individual shareholders. As such, the relationship with the controlling shareholders is quite clean. There are also no historical material asset acquisitions from the major shareholders. In 2019, Weiming is awarded by the China Capital Annual Conference as one of the top 20 A-share companies and its Board of Directors is named as the best investor relations in the A-share main board. Based on public information, the major shareholder Weiming Group is very dedicated to environmental business, and there is no significant exposure to cyclical businesses that may need to milk the listed Weiming Environment. It also appears that Weiming is the only key business that the Chairman Xiang Guangming is involved in.

4.2 Investment thesis

Largest A-share waste treatment company with good technological capability. With a market capitalisation of Rmb28bn, Weiming is the largest A-share waste treatment company. At the end of 2019, it has a total of 20 waste incineration projects, with a daily capacity of 15,500 tonnes. The company's business model has been based on BOT (Build-Operate-Transfer) and BOO (Build-Owned-Operate), and it has also increased its participation in PPP projects. Weiming has a long-established history in China dating back to 1998 and was initially focused on Wenzhou, Zhejiang. Since then, it has experienced phenomenal growth. Zhejiang remains its key operating area still, which it has a 36% market share.

One key strength of Weiming is its solid research and development capability. It basically researches and manufactures in-house the core waste incineration treatment, flue gas treatment, automatic control, leachate treatment, kitchen waste treatment and other equipment for the construction and operation WTE projects. For example, taking into consideration of the low heating value and high water content of municipal domestic waste in China, Weiming developed its proprietary flue gas treatment system, technology, and equipment including the “HWM 2-stage reciprocating grate” and “semi-dry neutralizing reaction tower and laminated bag filter” (Figure 55). The 2-stage reciprocating grate can effectively meet the needs of domestic waste in China, which burns and falls into pusher type grate and continuously turns and combusts with the ignition loss of less than 3%. While many other players are still procuring equipment from third-parties, Weiming's self-sufficient equipment business eliminated its need to rely on external equipment suppliers and allow it to enjoy a high profitability.

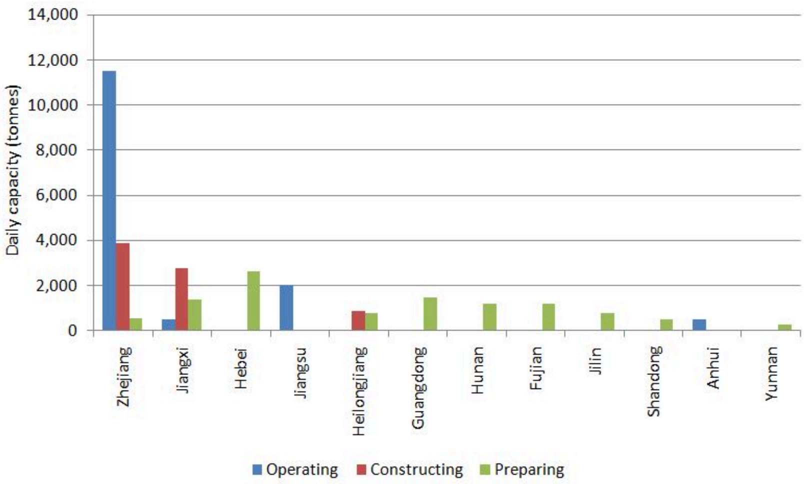
Figure 55: Weiming's propriety WTE equipment



Source: Company data

Accelerating growth rate with geographical and capacity expansion. Weiming's solid profit momentum is achieved on the back of successful capacity expansion through signing up new projects. Besides Zhejiang, Weiming now has presence (including operating, constructing, preparing projects) in other 11 provinces in China (Figure 56), and most of them are coastal provinces which have more significant demand for waste treatment. The strategic geographical coverage should position it well to capture the industry growth prospects, driven by both rise in urbanisation and increase proliferation of e-commerce. At the end of 2019, Zhejiang still accounted for 80% of its existing WTE capacity. Over the next several years and upon the completion of its outstanding projects under construction and preparation, we expect Weiming's geographical spread will further diversify, with Zhejiang to account for less than 50% of its total WTE capacity.

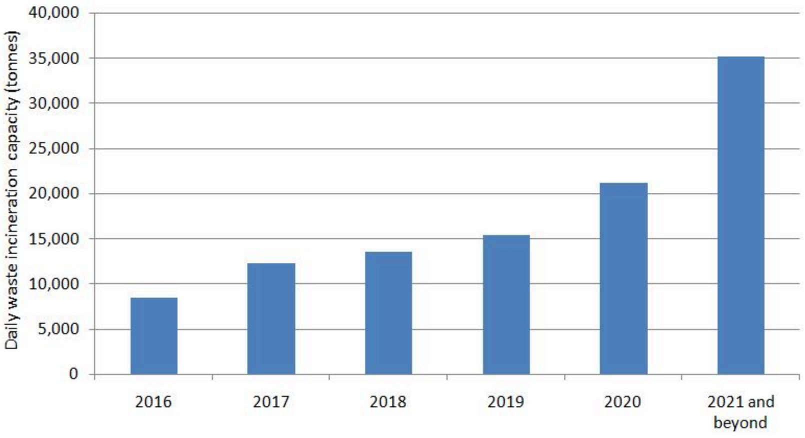
Figure 56: Weiming's WTE projects by location



Source: Company data

Since 2016, Weiming's WTE capacity has increased by over 50%, driving its rapid profit growth. Just in 2019, it signed an additional 10 projects and, together with 4 new projects added so far in 2020, its total projects on hand will have a capacity over 35,000 tonnes upon full completion. Based on the current project development schedule, we estimate Weiming's capacity will increase by another 37% in 2020, supporting its earnings growth for the next two years (Figure 57). Beyond 2020, according to the current pipeline, Weiming will have another 14,000 tonnes of waste incineration capacity to come on stream, securing its continuous earnings momentum.

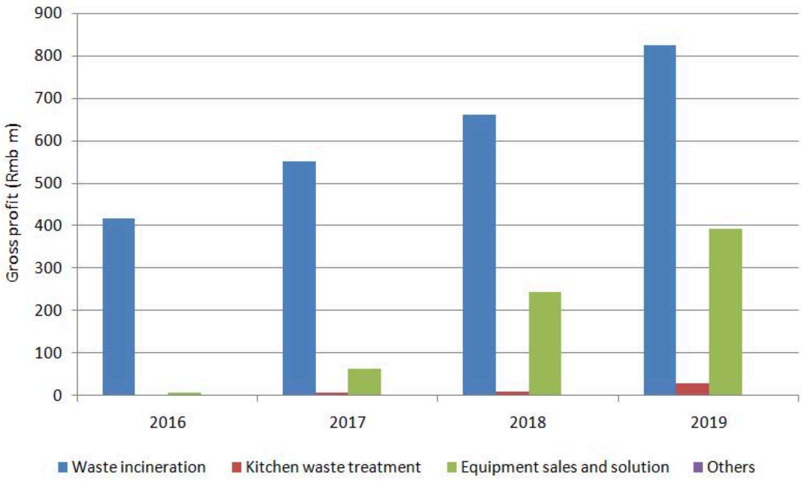
Figure 57: Weiming's waste incineration capacity



Source: Company data

Diversification into new hygiene treatment area an added driver. Besides geographical expansion, Weiming has also actively pursued business diversifications. In particular, the most important business outside of waste incineration is the sale of its waste treatment equipment to external customers. In 2019, external sales of its WTE equipment and solutions accounted for a significant 35% of its total sales and 32% of its gross profit. Growth rate for the business has been impressive, with gross profit from equipment sales surged by 60x over the last four years (Figure 58). Given the solid demand growth of waste treatment facilities in China, we expect Weiming will continue to see strong momentum at its equipment and solution sale business.

Figure 58: Gross profit growth by segment

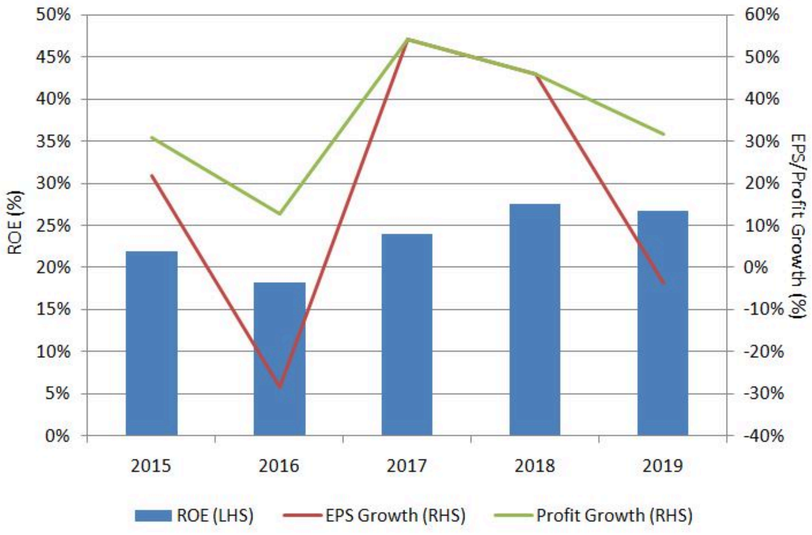


Source: Company data

Over the years, Weiming has expanded into other segments of the waste treatment and environmental protection businesses including kitchen waste treatment, leachate treatment and waste collection. While these businesses only accounted for 2% of its total gross profit in FY19, they have experienced rapid growth. Over the last four years, gross profit for these business has recorded a growth of 23x. As Weiming continued to secure new projects, we believe profit from kitchen waste treatment, leachate treatment and waste collection businesses will see good momentum. For example, it has already added two new kitchen waste projects in Zhejiang so far in 2020 with a total capacity of 375 tonnes per day, involving total investment of Rmb160m.

Private enterprise benefiting from government policies and driving shareholder value. As a POE that focuses on maximising shareholder value, Weiming has recorded excellent performance since IPO in May 2015, with its share price rose by 5.7x since then. This is even before including an aggregate of Rmb1.30 of total dividends per share. We believe Weiming's status as a POE has provided it the competitive advantages of higher flexibility and more efficient operations relative to the state-owned enterprises. Over the last five years, ROE has been on a steady uptrend, and profit has achieved consecutive growth with an aggregate increase of 3.4x (Figure 59). Weiming has provided employees with share ownership program. Such program in 2019 currently holds a total of 10m shares, representing 1.08% stake in the company. At an average subscription price of Rmb21.89/share, the program is sitting on an excellent return of 33.8% in just six months' time.

Figure 59: Historical ROE, profit growth and EPS growth



Source: Company data

Given Weiming's size and POE status, we believe it can benefit from the government's introduction of the Solid Waste Pollution Law. It has the scale and technological knowhow to capture the opportunities posed by the change in the pricing mechanism of the waste treatment industry. The government policies of encouraging the participation of social entities in the prevention and control of environmental pollution caused by solid waste, and providing preferential tax treatment for these enterprises are positive to Weiming. These are potential drivers that can improve its business scale and return in the future. We also believe the Law may create more opportunities for privatisation of government waste treatment assets and M&As in the industry and Weiming's strong position will be an important advantage in taking hold of them.

4.3 Key risks

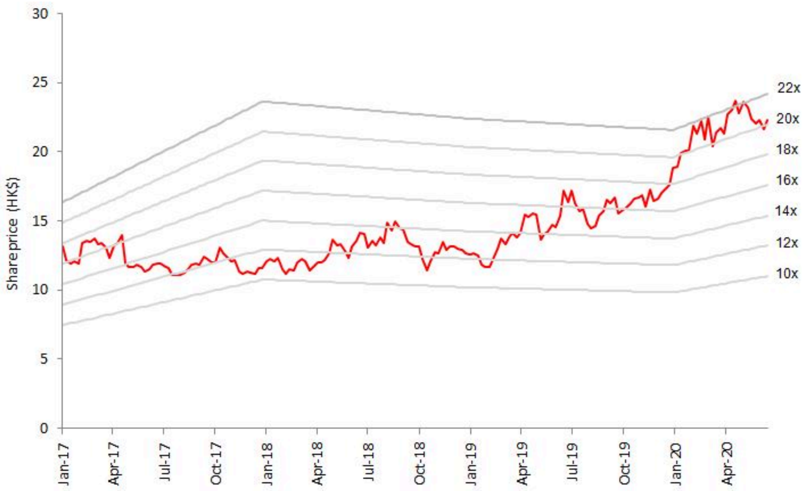
The key risks for Weiming are: 1.) unfavourable change in WTE on-grid tariffs; 2.) weak profitability of the expansion into new businesses; 3.) over-aggressive expansion in project and capacity that impairs its financial position; and 4.) unexpected negative issues related to corporate governance.

4.4 Valuation

Share price of Weiming has rallied 27.7% YTD, outperformed all major China and Hong Kong benchmark equity market indices. As a result, the valuation (20.1x 12-month forward PER) is now at the high end of its historical trading range of 10.5-22.5x forward PER over the last three years (Figure 60).

When compared with the Hong Kong listed peers, it is clear that the stock's valuation is rich given the higher multiple of the A-share market. However, we believe such valuation can be justified by the solid project pipeline that it has secured and a very solid financial position. In addition, Weiming also has the highest 3-year EPS CAGR among the five stocks covered in this Original, which we believe should lend support to the valuation.

Figure 60: Weiming - P/E Band



Source: Eastmoney Choice

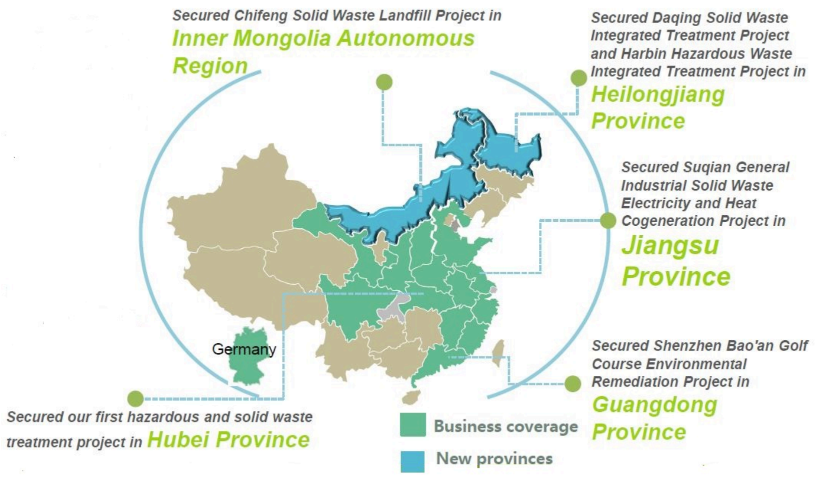
5. China Everbright Greentech (1257.HK)

The strengths of China Everbright Greentech (1257 HK) (CEGT) lie in its niche focus on integrated biomass utilisation and hazardous and solid waste treatment. It will stand to benefit from the government's increased effort in hazardous and solid waste treatment. Over the next two years, its secured project pipeline will drive earnings performance, but the slowing biomass new project in last year may suggest slower profit growth in this division. Although it is trading on just 3.6x 12-month forward PER, its high gearing, small size and exposure to the risks of removal of government subsidies are the key factors that it ranks at the bottom of our pecking order.

5.1 Background

CEGT is an environmental protection service provider, with its businesses focusing on integrated biomass utilisation, hazardous and solid waste treatment, environmental remediation and solar energy and wind power. Currently, the company's business cover 16 provinces, municipalities and autonomous region in China, and in Germany (Figure 61). As at the end of 2019, CEI is its controlling shareholder with a 69.7% stake.

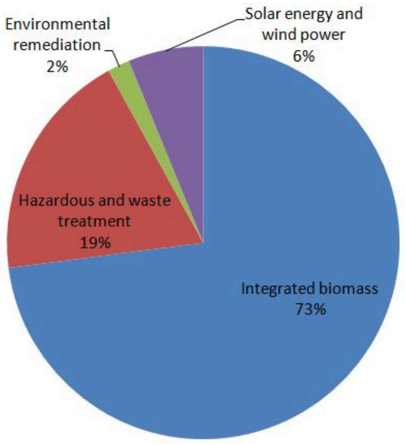
Figure 61: CEGT's geographical coverage in China


Secured Chifeng Solid Waste Landfill Project in
Inner Mongolia Autonomous Region
Secured Daqing Solid Waste Integrated Treatment Project and Harbin Hazardous Waste Integrated Treatment Project in
Heilongjiang Province
Secured Suqian General Industrial Solid Waste Electricity and Heat Cogeneration Project in
Jiangsu Province
Germany
Secured Shenzhen Bao'an Golf Course Environmental Remediation Project in
Guangdong Province
Secured our first hazardous and solid waste treatment project in Hubei Province
Business coverage
New provinces

Source: Company data

Net profit of CEGT was solid in FY19, achieving a 46% increase to HK$1.32bn. Total revenue grew 32.5% to HK$9.3bn, with gross margin expanded by 0.6pp to 30.2%. Integrated biomass is the most important business segment for CEGT as it represented 73% of CEGT's EBITDA in FY19. The second largest EBITDA contributor is hazardous and waste treatment which generated 19% of its EBITDA in last year (Figure 62).

Figure 62: Breakdown of FY19 EBITDA



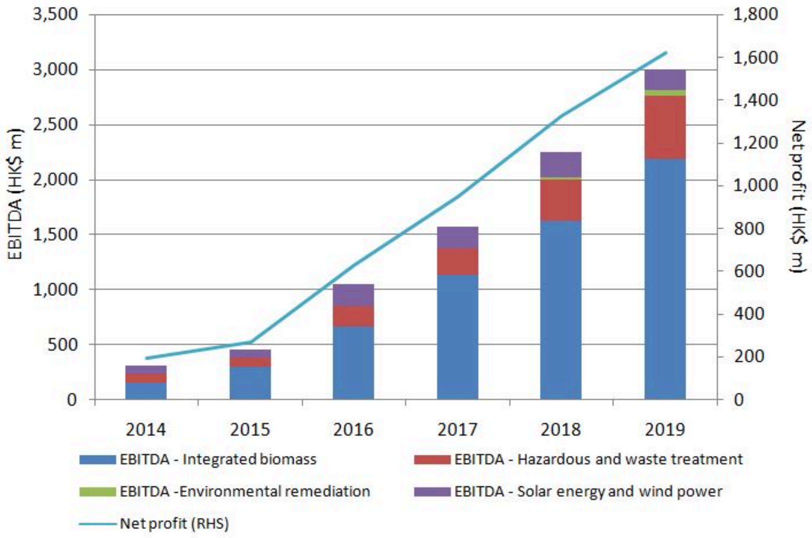
Source: Company data

5.2 Investment thesis

Comprehensive player in China's greentech industry. Instead of being a waste treatment company focusing on waste incineration, CEGT's unique position as a comprehensive operator in China's greentech industry is one of its major competitive edges. CEGT's business mix, including integrated biomass utilisation, hazardous and solid waste treatment and environment remediation and solar and wind power, enable it to capture the opportunities posed by the increase in the government's focus on environmental preservation and protection. In particular, CEGT's business exposure required sophisticated technological knowhow. The fact that CEGT is highly ranked in the installed capacity and power generation through biomass provides evidence for its competitive strengths.

As an integrated greentech company, CEGT reduced its risk exposure to any single segment within the environmental sector. On the back of the diversified business portfolio, CEGT has achieved impressive revenue, EBITDA and profit growth over the last five years - at a 5-year CAGR of 54.4%, 57.7% and 52.5%, respectively (Figure 63). In fact, with the exception of solar and wind power which the profit has been flat, its other businesses have all recorded sharp surge over the period. In our view, this suggests that CEGT's business strategy is successful. In addition, its excellent execution ability positions it well to benefit from the positive macro-environment and government policies following the promulgation of the Solid Waste Pollution Law.

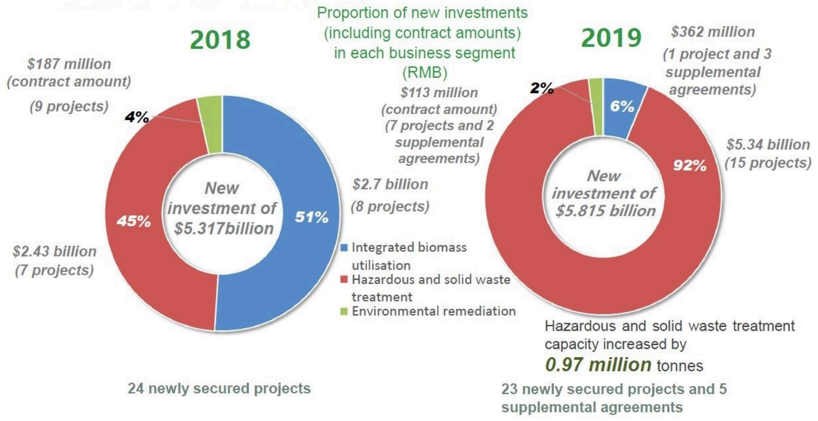
Figure 63: Historical EBITDA and net profit trend (HK$m)



Source: Company data

Solid pipeline momentum in hazardous and solid waste treatment. We believe CEGT is set to see solid growth in its hazardous and solid waste treatment division. EBITDA for this division increased at an enviable CAGR of 44% in the last five years. CEGT also has an all-round treatment capability for hazardous and solid waste, including landfill, incineration, physicochemical processing and integrated utilisation, providing it the flexibility to capture the market opportunities. This is demonstrated by the excellent project wins in 2019 - a total of 15 projects with aggregate annual capacity of 0.97m tonnes are added, involving total investment of HK$5.4bn (Figure 64).

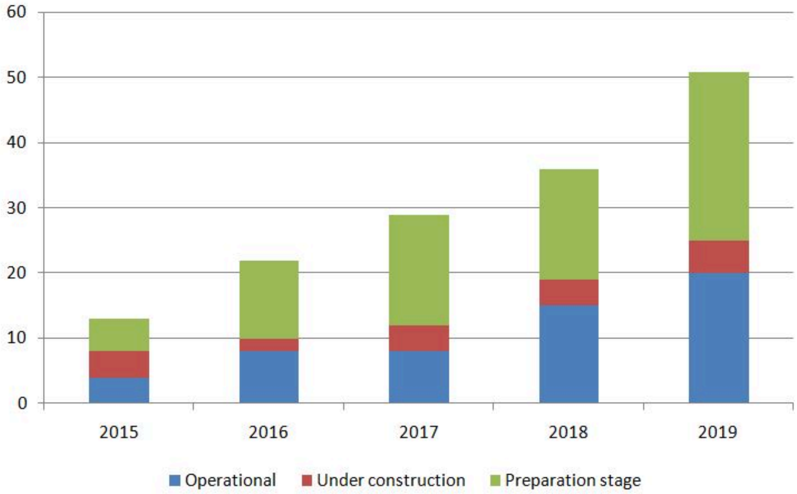
Figure 64: CEGT's new project addition in FY18 and FY19



Source: Company data

We believe CEGT's strong project pipeline will underpin a positive growth picture in the next three years. At the end of 2019, CEGT has a total of 51 projects in this division (20 operational, 5 under construction and 26 in preparation). When all these projects are completed, its annual design capacity will increase to 2.23m tonnes, a 4.6x leap from the operational capacity of 400,000 tonnes at end-2019 (Figure 65). Such capacity growth will be the major building block for the division's profit in the long term. CEGT has moved its business model from standalone projects to integrated treatment, with examples including projects at Zhangjiagang, Huangshi and Wenling.

Figure 65: No. of hazardous and solid waste projects

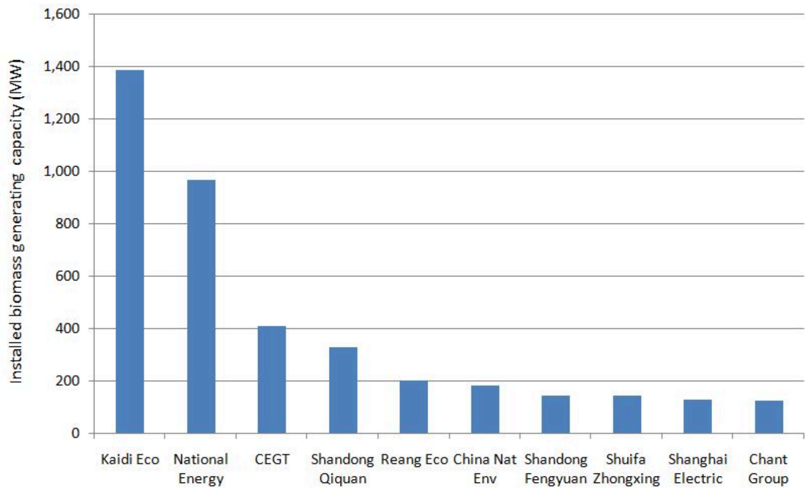


Source: Company data

Over the last five years, however, the division's EBITDA margin has come down from 50.1% to 37.7%. With the introduction of the Solid Waste Pollution Law and the related supportive measures, we think that a more commercially oriented pricing may help CEGT to improve its profitability of solid waste treatment. The increasingly stringent requirements and elevated standards for handling hazardous waste as provided in the Law should also potentially lift the return of its hazardous waste treatment operations.

A leader in integrated biomass utilisation. Integrated biomass is the single most important division of CEGT, contributing 73% of its EBITDA and 74% of net profit in FY19. The company use biomass raw materials, such as agricultural waste and forestry residue, for direct combustion power generation and power and heat cogeneration. CEGT also developed the urban-rural integration business model by combining integrated biomass utilisation projects and WTE projects to provide one-stop services for integrated treatment of agricultural and forestry residues and rural household wastes in county areas. Reflecting CEGT's leadership position, based on the 2018 data, it is ranked as the third largest and second largest biomass power generator in China on total installed capacity and power generation, respectively (Figure 66).

Figure 66: Top 10 biomass generating companies in China in 2018



Source: Biomass Energy Industry Promotion Association

Biomass division is the fastest growing one in CEGT - as a proportion of EBITDA, biomass has increased from 50% in FY14 to 73% in FY19. Divisional EBITDA also grew by a CAGR of 70% between FY14 and FY19 (Figure 67). New contracts continue to be the driver for its biomass business. In 2019, CEGT won a total of 4 biomass project agreements (1 new project and 3 supplementary agreements) with total investment of HK$362m. However, this has declined sharply from 7 projects in 2018, potentially indicating a slowing momentum going forward. CEGT currently has 48 biomass projects, with 32 of them operational, 13 under construction and 3 in preparation. Total capacity will amount to 1,002MW on full completion, compared with 730MW currently. Meanwhile, the EBITDA margin for the division is generally stable over the last five years. We expect the completion of the outstanding projects will be the key driver for biomass profit, as its capacity is set to rise by 37% over the next three years.

Figure 67: Key operating and financial statistics of biomass division

Operating/financial statistics	2015	2016	2017	2018	2019
On-grid electricity (MWh)	**440,641**	**618,718**	**1,393,204**	**2,557,059**	**3,826,504**
% Change	*62.5%*	*40.4%*	*125.2%*	*83.5%*	*49.6%*
Biomass raw material processing volume (tonnes)	**520,159**	**728,142**	**1,684,691**	**3,159,990**	**4,635,939**
% Change	*44.7%*	*40.0%*	*131.4%*	*87.6%*	*46.7%*
Household waste processing volume (tonnes)	**0**	**73,526**	**249,212**	**881,254**	**1,439,893**
% Change	-	-	*238.9%*	*253.6%*	*63.4%*
Volume of steam supplied (tonnes)	**0**	**0**	**171,027**	**363,391**	**818,804**
% Change	-	-	-	*112.5%*	*125.3%*
EBITDA (HK$m)	**300.6**	**666.7**	**1,143.2**	**1,631.9**	**2,192.9**
% Change	*96.3%*	*121.8%*	*71.5%*	*42.7%*	*34.4%*

Source: Company data

Environmental remediation an added growth engine. CEGT's environmental remediation businesses include restoration of industrial contaminated sites, restoration of contaminated farmland, restoration of mines and landfills, integrated treatment of oil sludge and environmental stewardship services. The company has started this business only three years ago, but the momentum is building up fast. In FY19, there are 21 projects completed or in implementation, compared with 13 projects in FY18, driving a 44% growth in the division's revenue. What's more impressive is the rapid rise in profit contribution - EBITDA rose 120% to HK$55m in FY19 (Figure 68).

Figure 68: Performance of environmental remediation

HK$ m	2017	2018	2019
Revenue	0	118	288
EBITDA	0	25	55
Net profit	0	20	31
EBITDA margin	-	21.2%	19.1%

Source: Company data

CEGT currently has 9 environmental remediation projects under implementation with locations including Jiangsu, Zhejiang and Jiangxi, having a total contract value of Rmb334m. In the near term, the contribution will likely to stay small (2% of EBITDA in FY19). However, the strong pipeline will surely fuel future growth. CEGT has another three environmental remediation projects with total value of Rmb112m currently in preparatory stage, and is expected to secure more in 2H20. Its plan is to further expand this business, with focuses on the markets of the Guangdong Hong Kong Macao Greater Bay Area and the Yangtze River Delta Economic Zone which demand is strong. CEGT will optimise resource allocation to this segment with the aim of becoming an industry leader. The highly fragmented remediation industry, which has more than 10,000 companies in China currently, is expected to provide opportunities for CEGT to make acquisitions and pursue consolidations.**5.3 Key risks**

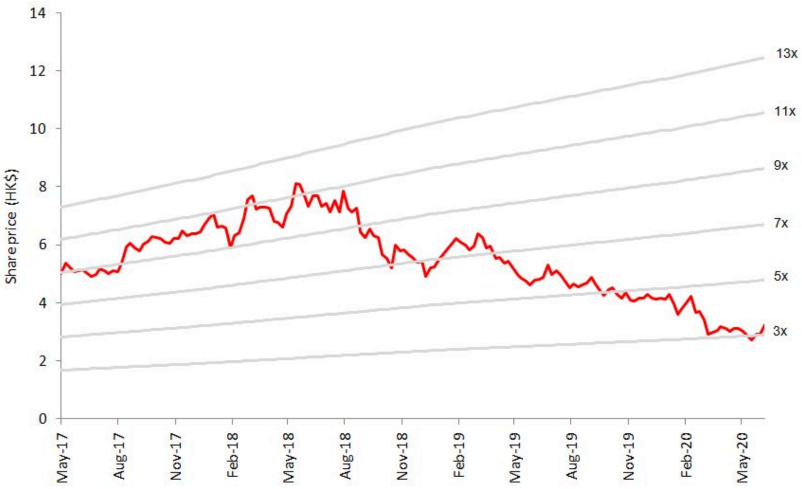
The key risks for CBGT are: 1.) unable to secure new biomass, hazardous and solid waste, and remediation projects; 2.) delay in construction of pipeline projects; 3.) unfavourable change in on-grid tariff and biomass subsidies; 4.) margin erosion due to inability to control cost; and 5.) overaggressive expansion that put pressure on balance sheet (FY19 gearing = 79.4%).

5.4 Valuation

CEGT's share price has fallen by 40% from its IPO price of HK$5.40, and is now trading on just 3.6x FY20F PER and 0.6x P/B. The current valuation level is not too far from the historical low of 2.9x PER (Figure 69).

Relative to its peers, CEGT's P/B vs. ROE ratio and PEG are also cheap. However, we believe that the stock's valuations are constrained by the worries on the potential change in government's plan to lower on-grid tariffs for renewable energy, and this has caused the significant underperformance. Moreover, the company's high gearing of 79.4% is also a concern as this may constrain its future project addition momentum. Lastly, CEGT has the smallest market capitalisation among the first stocks in this Original, and this also makes it difficult to demand a high premium against peers. Investors also have the alternative to gain exposure to greentech by investing in its parent CEI.

Figure 69: CEGT - P/E Band



Source: Eastmoney Choice

Conclusion

The waste treatment sector in China has undergone a rapid growth in the last five years, but the share prices of many of the companies in the sector have underperformed the market by significant margin. We believe this phenomenon is set to change with the government's implementation of the Solid Waste Pollution Law. Previously, the concerns on these companies are the uncertainties on their collection of government subsidies, future pipeline, potential removal of on-grid tariff subsidies, high gearing and their small sizes generally.

Over the next twelve months, we expect local governments to roll out policy measures and concrete regulations on waste treatment charges, and this will be positive to the sector as many uncertainties are cleared. Moreover, the opportunities for industry consolidation and acquisitions of government privatisations mean that the scale of many leaders will grow bigger. These factors will serve as positive catalysts, leading to a potential re-rating of the sector.

Our intention for this Smartkarma Original is to provide the basic investment thesis on China's waste treatment sector and the five individual companies covered. We expect to publish more detailed Insights on these companies in the future to provide a more comprehensive analysis of this exciting sector which is expected to undergo a meaningful structural change.

Note: All share prices and indices in this Smartkarma Original are based on closing on 19 Jun 2020.

Disclosure & Certification

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— Osbert Tang, CFA (30 May 2020)

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